The OIL and GAS JOURNAL

PRODUCING REFINING MARKETING

VOL. 24. NO. 50. TULSA, OKLAHOMA, MAY 6, 1926

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Refinery Section Starts on Page 182

Production Up as Drilling Increases

Highest daily average estimated production week ended May 30, 1925, 2,347,984 bbls. Lowest in 1925, January 3, 1,911,730 bbls.

All But Three Main Producing Areas Show Gain. British Strike May Curtail Shipments of Export Oil

By Andrew M. Rowley

Highest daily average estimated light oil production in 1925, week ended January 17, 1,525,220 bbls. Lowest in 1925, July 18, 1,374,173 bbls.

Increased drilling activity in practically every producing area of the United States, stimulated by the demand for crude and the promising results already obtained, is being felt in the production columns, every section except the Gulf Coast, Southwest Texas and East Central Texas registering an increase in output during the past week. That this situation has been gaining momentum for some time is indicated in the monthly report of operations in all fields east of California, which shows 931 more operations in April than in March. The same condition holds true in California, where a decrease in drilling in some fields will be offset by new work planned.

The substantial increase in crude oil production last week, particularly the gain in output of crude especially desirable for its gasoline content, should be considered by those who believe crude oil prices should be advanced at this time. Another feature of the situation is the fact less crude is being withdrawn from storage now than was the case six weeks ago. In Oklahoma and Kansas, it is estimated there is somewhat less than 100,000 barrels daily being pulled out of storage now whereas six weeks ago the quantity averaged approximately 200,000 barrels daily.

The effect of the British strike on the petroleum situation in this country cannot be determined yet. The coal strike probably would have benefited the oil business here but the general strike, tying up shipments, changes the situation. It seems probable shipments to England will be curtailed for the time being, at least.

The advance in price of Grade B Coastal crude is another evidence of the demand for gasoline content crude. Until this time, Grade A, desirable for its lubricant qualities, commanded the higher price, but cracking processes have placed Grade B on a higher plane in the price schedule.

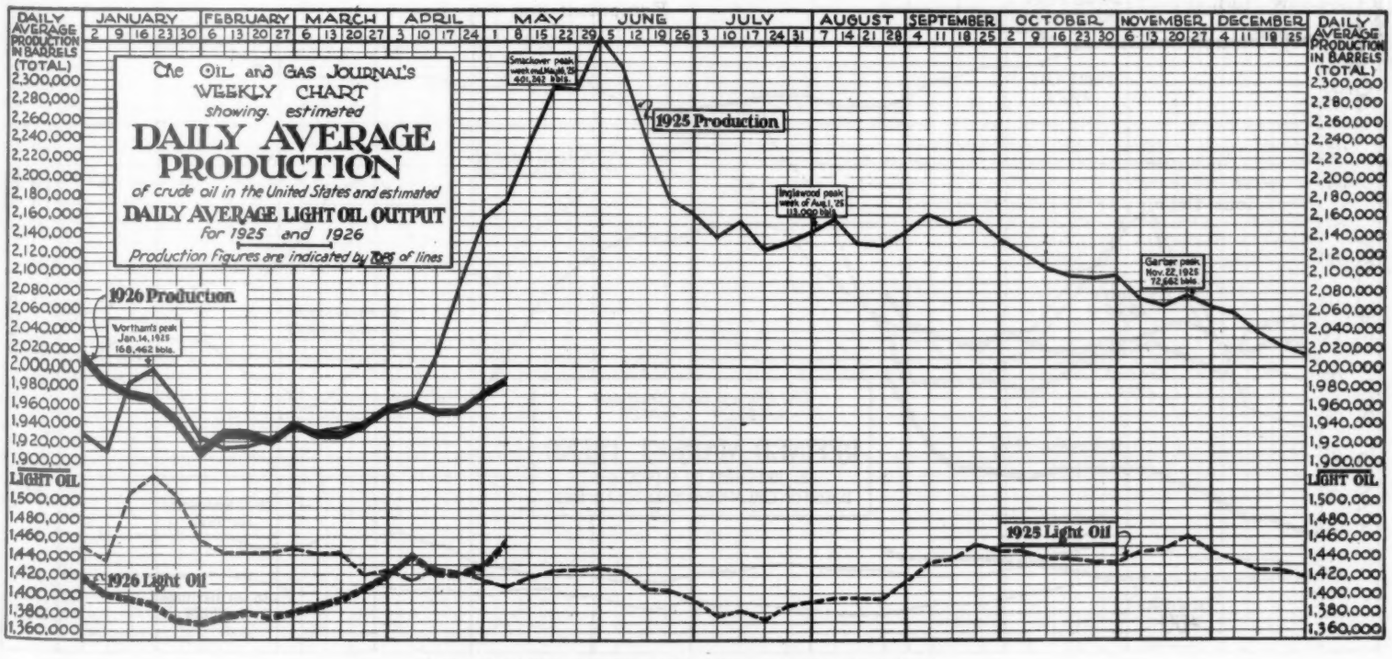
The entire petroleum situation continues good. There still is considerable talk of crude price advances being made within the very near future but conditions really do not warrant an increase at this time and the industry doubtless would prosper more if crude price rises were postponed until there is a better basis for an increase.

PRODUCTION IN THE UNITED STATES

Estimated daily average production of light and heavy gravity crude oil in the United States for week ended May 1, and a comparison with the previous week follows:

	May 1		Apr. 24	
	Light	Heavy	Light	Heavy
Oklahoma—				
Tonkawa	37,060	.....	37,145	.....
Burbank	39,970	.....	41,180	.....
Other Osage Fields	33,255	.....	32,945	.....
Cushing and Shamrock	21,815	.....	21,830	.....
Bristow and Eastern Bristow	29,840	.....	29,905	.....
Cromwell	18,030	.....	18,195	.....
Papoose	12,090	.....	12,285	.....
Garber	34,125	.....	34,605	.....
Blackwell-Braman	17,740	.....	16,520	.....
Davenport	15,140	.....	15,585	.....
Wewoka	34,905	.....	34,870	.....
Northern Miscellaneous	102,535	.....	100,710	.....
Southern Fields	66,710	.....	66,635	.....
Total Oklahoma	463,215	.....	462,410	.....
North Louisiana	54,365	.....	50,890	.....
Arkansas—				
El Dorado and Calion	7,430	.....	7,425	.....
Smackover Light	17,640	.....	17,540	.....
Smackover Heavy	.....	132,745	.....	133,375
Miscellaneous	15,395	.....	12,345	.....
Total Arkansas	40,465	132,745	37,310	133,375
North Central Texas	184,773	.....	181,299	.....
Powell	29,700	.....	31,280	.....
Mexia, Currie, Richland, etc.	15,780	.....	16,060	.....
Wortham	9,650	.....	10,325	.....
Kansas	105,210	.....	102,890	.....
Total Mid-Continent Area	903,158	132,745	892,464	133,375
Gulf Coast	.....	99,940	.....	104,007
Southwest Texas	.....	38,555	.....	38,715
Eastern	102,400	.....	100,200	.....
Rocky Mountain Area	108,480	.....	103,925	.....
California—				
Santa Fe Springs	49,000	.....	49,500	.....
Long Beach	104,500	.....	103,500	.....
Huntington Beach	45,000	.....	44,500	.....
Torrance	5,500	22,500	5,500	23,000
Dominguez	20,500	.....	21,000	.....
Rosecrans	19,000	.....	19,500	.....
Inglewood	30,000	22,000	30,000	22,000
Remainder of State	69,000	216,000	65,000	217,000
Total California	342,500	260,500	338,500	262,000
Total United States	1,456,538	531,740	1,435,089	538,097
Grand Total	1,988,278		1,973,186	

→ **Total Increase, 15,092 Bbls.; Light Oil Increase, 21,449 Bbls.** ←


The OIL and GAS JOURNAL'S
WEEKLY CHART
showing estimated
DAILY AVERAGE PRODUCTION
of crude oil in the United States and estimated
DAILY AVERAGE LIGHT OIL OUTPUT
for 1925 and 1926
Production figures are indicated by tops of lines
1926 Production
1925 Production
1926 Light Oil
1925 Light Oil
Smackover peak week ending May 30, 401,340 bbls.
Inglewood peak week of Aug. 1, 25 113,000 bbls.
Garber peak Nov. 22, 1925 72,662 bbls.
Wortham's peak Jan. 14, 1925 168,462 bbls.
DAILY AVERAGE PRODUCTION IN BARRELS (TOTAL)
LIGHT OIL
JANUARY FEBRUARY MARCH APRIL MAY JUNE JULY AUGUST SEPTEMBER OCTOBER NOVEMBER DECEMBER

WHAT AND WHERE TO BUY—PAGES 221-222-223

Gasoline and Kerosene Go Higher

General Tank Wagon Advances Give New Strength to Oklahoma Refined Market. Prices Still Not Entirely Stabilized. Naturals Uncertain. Fuel Oil Firm

By Neil Williams

All developments in the Oklahoma (Group 3) refined market the past week were extremely bullish. Additional tank wagon advances, both in gasoline and kerosene, in nearly all marketing territories of the country, increase in export quotations and rumors and indications of higher crude prices in the Mid-Continent combined to further strengthen the position of Oklahoma refiners.

A raise of 1 cent in the tank wagon price of gasoline throughout the Standard Oil Co. of Indiana territory, in which the bulk of Mid-Continent refined products are marketed, affected the Oklahoma market most directly. This, with the higher export postings, was followed immediately by an upward flurry in refinery quotations on all grades of gasolines.

So rapid were advances in quotations to adjust themselves to new tank wagon conditions that refinery markets on gasoline and kerosene were completely upset the greater part of the week and it was not until Monday and Tuesday that it was entirely possible to determine a true market level.

With prices now becoming more stabilized, market changes during the week can be summed up as follows:

1. Advances of from a half to 1 cent in all grades of gasoline and naphthas.

2. Kerosene prices 1 cent higher.

3. Distillates stronger due to the tight kerosene situation but prices not materially higher.

4. Fuel oil and gas oil unchanged.

Natural Gasoline Flurry

The latest development was the sudden jump in the natural gasoline quotations. Rapid advances in all grades of naturals Saturday and Monday resulted in a very unsettled condition. While some market observers expected the natural market to settle at a slightly lower level than many of the quotations asked, nevertheless the flurry added strength to the already bullish feeling.

The rapid advance in quotations slowed orders of gasoline to a great extent and by Monday trading was comparatively quiet to what it was the preceding week. Exporters, who had purchased approximately 2,000,000 gallons of higher gravity gasoline from Oklahoma and North Texas refiners earlier in the week, also apparently had withdrawn from the market.

However, this fact was not taken as discouraging and for the most part refiners were of the opinion that trading would be resumed briskly as soon as conditions became more stabilized. With this in view, prices seemed firmer Monday than at any other time this year and some refiners continued to advance quotations.

Refiners were backed up in their position by renewed talk of a general Mid-Continent crude advance. Several buyers reported they already had made purchases on the strength of such an increase although refiners for the most part were hesitant on selling ahead on this account.

Generally refiners are not looking with favor on a crude advance at this time. Most of them are of the opinion that the last increase the first of February worked an undue hardship on them from which they are just now recovering, and that a raise now would only force them back on the close margin of profit, under which they have been laboring since February 1.

While prices are strong and there is no indication that there will be any weakening in the next few weeks at least, it is generally admitted that a greater domestic and export demand for gasoline is needed at this time if market prices are to be advanced materially on present crude and tank wagon schedules.

Plenty Available

There still is known to be plenty of gasoline available, which is borne out by Government figures on stocks, and several refiners have been pushing instructions to move their products, although they are making no concessions. A large quantity of gasoline has been moved from refinery stocks in the last few weeks and this will tend to hold markets firm, but the demand still has not been what was expected, it is claimed.

This by no means is taken as a discouraging factor as weather conditions have still been a little uncertain in many

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REFINED MARKET BAROMETER

General tank wagon advances in gasoline and kerosene in nearly all sections of the country featured refined markets the past week. Both products were materially strengthened with refinery quotations in the Middle West and Mid-Continent centers from ½ to 1 cent higher than a week ago. Kerosene continued the tightest product in all areas despite a marked falling off in California shipments to Asia. Natural gasolines also were stronger east of the Rocky Mountins. Fuel oil, gas oil and distillates continued firm generally. Distillates in a few areas, were slightly tighter due to the demand for kerosenes. Furnace oils also continued in demand over the northern states. Lubricants on the whole showed improvement with some grades of Pennsylvania and Gulf Coast oils higher in price.

Mid-Continent—Gasoline and kerosene prices continued rapid climb in all districts, strengthened by general tank wagon advances. Demand for gasoline slower but all refiners behind on kerosene orders. Natural gasolines held for higher prices and market uncertain. Distillates slightly firmer in Oklahoma and Texas. Fuel oil and gas oil unchanged. Lubricant demand improved.

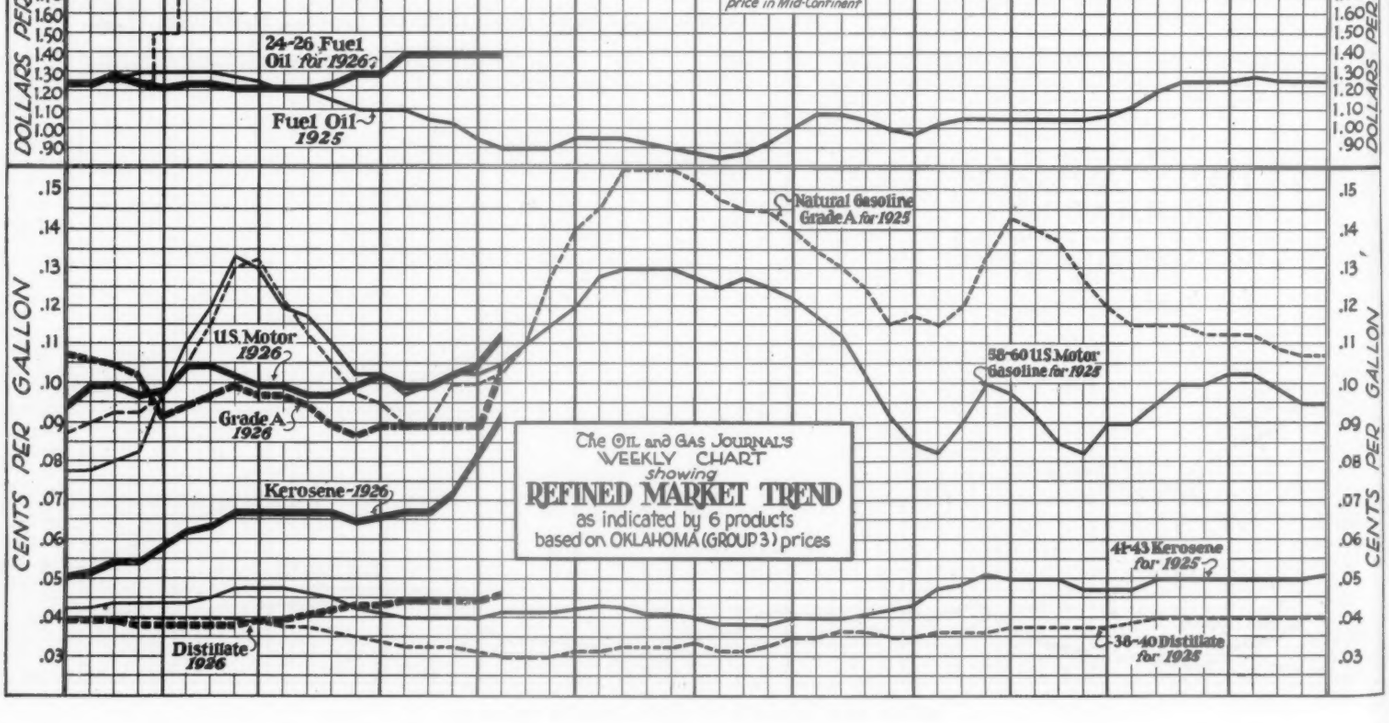
Atlantic Seaboard—Tank wagon and export advances strengthened eastern gasoline and kerosene markets. Kerosene very strong with refiners holding product for cracking stock. Gas oil sales heavy. Diesel business increasing. Bunker oil still firm but orders dull. Lubricants improve. Wax in demand. Petrolatums improve.

Pennsylvania—Gasoline and naphtha demand better. Higher prices reflected in tank wagon raises. Kerosene continues to strengthen. Fuel oil demand fair. Cylinder stocks and wax weak. Neutrals unchanged.

Chicago—Market tone generally optimistic. Gasoline demand slower but still good. Naturals stronger. Kerosene deliveries still delayed. Furnace oil in demand for immediate shipment. Gas oil easier. Fuel firm.

California—Domestic demand for gasoline lighter but shipments to eastern coast increase. Naturals soft. Fuel oil strong. Kerosene shipments to Asia off.

Gulf Coast—Generally unchanged. Few grades of lubricants higher.



Refining Becoming More Concentrated

Annual Survey Shows Larger Capacity Although 30 Less Plants Operating. Many Shut-Down Plants Dismantled

By C. O. Willson

The trend in refinery operations during the past year has been toward larger capacities and fewer plants, according to the annual survey of the United States completed by The Oil and Gas Journal as of May 1, 1926. This tendency toward concentration applies to both operating and shut down plants.

As shown in Table 2, there were 355 plants operating on May 1 with a daily crude capacity of 2,769,430 bbls. These totals compare with the May 1 report of last year which showed that 385 plants were operating with a daily capacity of 2,680,052 bbls. Although 30 less plants were operating this year the total capacity of these plants was 89,398 bbls. greater than last year.

The May 1 report of last year showed 199 shut down plants. To this number has been added the 30 plants which were closed down during the past year. However, as shown in Table 2 only 160 plants were listed as shut down on May 1 of this year. This was due to the fact that 69 plants were dropped because they had been wholly or partially dismantled and no longer represented potential refining capacity.

Most of these dismantled plants were located in the Mid-Continent Field. Texas had 23 less plants than last year, Oklahoma 21, Kansas 7, Arkansas 7 and Louisiana 5. Most of these plants were built during 1918, 1919 and 1920, a boom period in refinery growth in the Mid-Continent area in number of plants constructed. Few of these plants were ever consistently operated and most of them had been shut down for four or more years.

TABLE 1
Refinery Operations Since 1914

	Completed	Indicated Daily Capacity
1914	176	.....
1918	267	1,186,155
1919	289	1,295,115
1920	373	1,530,565
1921	415	1,888,800
1922	479	2,164,050
1924	574	3,046,790
1925	584	3,023,682
1926	515	3,068,340

Note: The 1924, 1925 and 1926 reports were compiled by The Oil and Gas Journal and the remainder by Government bureaus.

A majority of these abandoned refineries were small skimming plants with a capacity of 2,500 bbls. or less. Corrosion soon wrecks the equipment of a shut down plant unless an operating force is maintained to keep stills, condensers, boilers, etc., in repair. Even in the few cases where an effort is made to keep the plant in repair, the equipment is of little value in modern refinery methods which have been completely changed in many respects during the past two or three years.

It is due to this fact that the owners of many of the shut down plants junked their equipment during the past year and sold the plant site for other uses. In checking up these plants it was usually found that they no longer belonged to the companies whose name they bore. The companies had given up their charters. Many of the concerns had passed through receivership proceedings and the plants had been sold to parties not engaged in any phase of the oil business.

Junking to Continue

It is probable that the junking of old plants will continue during the coming year so that regardless of increases in the total crude capacity in United States the total number of plants will continue to decrease. This is a natural development of the fact that there are adequate pipe line connections from all fields to established refineries and the further fact that there is a demand for maximum efficiency in plant operations. This last development is gradually eliminating the small skimming and topping plants with their small investment and their relatively inefficient method of operation when compared to refineries with cracking facilities and other equipment to secure the maximum yields from crude oil. The only possible development which could change this trend toward concentration would be the opening of a large producing area remote from pipe line connections. This development—as it did in the Mid-Continent in 1918-1920 and California in 1923—might result in new plant construction programs. With the present widely scattered pipe line facilities and the keen competition among established refiners to secure additional crude supplies, it is doubtful if the new building programs would offset the decline due to plants being abandoned.

In this connection if the 160 shut down plants which accompany this article are checked with The Oil and Gas Journal's reports for 1925 and 1924 it will be found that approximately 100 of the 160 were shut down in two previous reports. In fact, many have been shut down for three to five years. This means that they are of little significance at the present time when potential refinery capacity is being considered.

Record Capacity

Despite the decrease in total number of plants the total crude capacity (operating plus shut down plants) is slightly larger than any previous time in the history of the industry. The total of 3,068,770 bbls. (Table 1) represents a 35,088-bbl. increase over May 1 of last year and 21,980 bbls. greater than May 1, 1924, which was the previous high mark. It is well to remember in this connection that despite the small increase in total crude capacity, the rated capacity of the 515 plants is still approximately 50 per cent greater than the crude production of the United States.

Returning to a consideration of the capacity of the operating refineries, it will be found by comparison that practically all of the total increase of 89,398 bbls. previously mentioned comes from the states of Texas and California. The capacity of the former, although 13 less plants were operating, increased from 465,980 bbls. daily to 531,500 bbls. With three less operating the capacity of the California operating refineries increased from 707,650 bbls. to 728,800 bbls. The remaining states showed either small increases or decreases.

No Change in Capacity

One of the outstanding developments of the past three annual surveys made by The Oil and Gas Journal lies in the fact that many companies operating both large and small refineries have not increased the rated crude capacities of their plants. The increases during the past three years have come largely from the plants of the Magnolia, Humble, Standard of Louisiana, Gulf and The Texas Company in the Gulf Coast areas and the General, Shell, Associated and Standard on the west coast. Several of these companies did not increase their rated crude capacities during the past year.

Other concerns such as the Standards of New Jersey, Indiana, Ohio, Kentucky, Atlantic Refining Co. and the Sinclair Refining Co. have made little or no increases in their crude capacities based on their annual reports for the past three years. A large number of smaller companies have pursued the same policy.

The explanation of how these companies have kept pace with the increasing demand for their products of course lies in greater plant efficiency, especially that phase of it applying to cracking. Instances could be cited where refiners have increased the gasoline output of their plants from 10 to 40 per cent without adding to their crude capacity.

Crude Capacity

It is also true that the significance of the term "crude capacity" is changing. Formerly it meant the maximum amount of crude oil which could be skimmed daily with little regard to efficiency operation. Then the tendency was to overestimate the capacity of a plant and few companies ever operated at the rated capacity. Now it often happens that a company will operate its plant from 10 to

(Continued on Page 150)

TABLE 2
Refining Capacity in the United States—Recapitulation by States

States—	No. of Plants	Crude Cap.	Plants Oper'g	Oper'g Cap.	Plants S.D.	S. D. Cap.	Crack'g Ttl.	Crack'g Op.	Process S.D.
Arizona	1	750	1	750	...	.....	...	...	...
Arkansas	12	29,750	9	26,500	3	3,250	5	5	...
California	87	782,750	58	728,800	29	53,950	7	7	...
Colorado	2	1,100	2	1,100	...	.....	1	1	...
Georgia	1	4,500	1	4,500	...	.....	1	1	...
Illinois	15	105,450	10	89,950	5	15,500	7	7	...
Iowa	1	1,500	...	.....	1	1,500	1	...	1
Indiana	7	80,600	3	75,000	4	4,800	5	3	2
Kansas	29	132,200	18	116,500	11	15,700	16	15	1
Kentucky	16	28,040	8	22,200	8	5,840	6	6	...
Louisiana	21	192,300	13	175,600	8	16,700	4	4	...
Maryland	4	54,000	3	49,000	1	5,000	3	3	...
Massachusetts	3	53,500	3	53,500	...	.....	3	3	...
Minnesota	1	1,000	...	.....	1	1,000	...	...	...
Missouri	4	16,500	2	14,000	2	2,500	3	2	1
Montana	15	17,200	12	15,200	3	2,000	1	1	...
New Jersey	8	246,000	7	241,000	1	5,000	5	5	...
New York	4	35,500	4	35,500	...	.....	2	2	...
New Mexico	7	4,800	7	4,800	...	.....	8	8	...
Ohio	16	52,600	15	52,600	1	750	...	...	...
Oklahoma	76	246,900	48	246,900	28	77,100	24	24	...
Pennsylvania	59	.....	53	147,500	6	3,700	19	19	...
Rhode Island	2	12,500	2	12,500	...	.....	1	1	...
South Carolina	1	10,000	1	10,000	...	.....	1	1	...
Tennessee	2	750	...	.....	2	750	...	...	...
Texas	99	609,200	59	531,500	40	77,700	22	22	...
Utah	2	4,750	2	4,750	...	.....	1	1	...
Virginia	1	2,500	1	2,500	...	.....	...	...	...
West Virginia	5	10,000	5	10,000	...	.....	1	1	...
Wyoming	14	97,300	8	97,300	6	6,600	9	8	1
Total	515	3,068,340	355	2,769,430	160	299,340	156	150	6

ABBREVIATIONS USED IN TABLES:
Complete plant (Comp)—Gasoline, kerosene, gas and fuel oils, lubricating oils, paraffin wax, petroleum coke, asphalt or both coke and asphalt, usually includes cracking.
Skimming plant (S)—Gasoline, kerosene, gas and fuel oils.
Skimming and lube (S&L)—Gasoline, kerosene, gas and fuel oils, lubricating oils.
Skimming and asphalt (S&A)—Gasoline, kerosene, gas and fuel oils, asphalt.
Skimming, lube and asphalt (SL&A)—Gasoline, kerosene, gas and fuel oils, lubricating oils, asphalt.
Wax plant (Wax)—Gasoline, kerosene, gas and fuel oils, lubricating oils, paraffin wax.
Lube plant (L)—Gas and fuel oils, lubricating oils.
Asphalt plant (A)—Distillates, gas and fuel oils, asphalt.
Topping plant (Top)—Tops, distillates, gas and fuel oils.
Cracking (C)—Same products as skimming.

ANNUAL SURVEY

In this issue, The Oil and Gas Journal gives its annual survey of refinery operations covering the entire United States. The name of the companies, plant location, plant capacity, type of plant and type of cracking equipment is given by states.

In this year's report the operating and shut down plants are given in separate lists. The list of shut down plants follows the operating plants.

OPERATING PLANTS BY STATES

Company, plant location—	Daily Cap. (Bbls.)	Type of Plant	Type of Cracking Process
ARIZONA			
Rio Grande Oil Co., Phoenix	750	S	
ARKANSAS			
Cross (H. H.) Refining Co.	3,000	S	
Home Refining Co., Camden	500	S	
Home Oil & Ref. Co., Hot Springs	500	S	
Houston Oil Co., Camden	3,000	C	Dubbs
Kettle Creek Refining Co., El Dorado	4,000	S&C	Dubbs
Lion Oil Refining Co., El Dorado	10,000	S&C	Burton
McMillan, Fehlman & Oliver (New-Ark) El Dorado	1,500	S	
Ouachita Valley Refining Co., El Dorado	1,500	S&C	Dubbs
Root Refineries, El Dorado	2,500	S&C	Dubbs
Total	26,500		
CALIFORNIA			
American Oil Fields Co.	10,000	Top	
American Petroleum Co., Coalinga	5,000	Top	
Associated Oil Co., Avon	50,000	Comp	Dubbs
Associated Oil Co., Los Angeles	10,000	Top	
Associated Oil Co., Martinez	10,000	Top	
Brown Process Co., Hynes	4,500	Top	
Brown Process Co., Maricopa	6,500	Top	
California Naphtha Products Co., Long Beach	1,000	Top	
California Petroleum Corp., Watson	25,000	Comp	
California Petroleum Corp., Coalinga	3,000	Top	
California Petroleum Corp., San Francisco	1,000	Top	
Capital Crude Oil Co., Santa Paula	150	Top	
Delaney Producing & Refining Co., Long Beach	3,000	Top	
Dominion Oil Co., Los Angeles	750	S	
East West Refining Co., Los Angeles	2,000	Top	
General Petroleum Corp., Lebec	12,000	S	
General Petroleum Corp., Olinda	3,500	S	
General Petroleum Corp., Vernon	35,000	S	
Gilmore Oil Co., Los Angeles	3,500	S	
Gilmore Oil Co., Los Angeles	2,500	A	
Hancock Refining Co., Long Beach	6,000	S	
Hercules Gasoline Co., Vernon	5,000	S&A	
Hercules Gasoline Co., Torrance	8,500	S	
Jameson Oil Co., Vernon	7,500	S	
Julian Petroleum Corp., Hynes	6,000	S	
Lovell Refining Co., Los Angeles	1,500	S	
MacMillan Petroleum Products Co., Signal Hill	3,000	S	

(Continued on Page 105)

Oil Outlook Most Favorable in Years

Chairman George H. Jones, of the Standard Oil Co. of New Jersey Discusses Situation in Address to Employes

Conditions in the oil business from a statistical standpoint are better than they have been at this time for the past three years. With no great increase in crude production threatening in the immediate future, with continued heavy withdrawals from light crude oil storage indicated and with practical assurance of enlarged consumption of gasoline, it is apparent that fundamentally the petroleum industry is in unusually good shape.

So far as can be seen the only elements that may prove damaging to this outlook are, first, any prolonged stretch of bad weather cutting down motor operation during the coming months, and, second, a business recession.

As regards the first, this cannot be forecast or predetermined. Since the first of the year the possibility of a slackening in general business, and even of a period of depression, has been more or less discussed. Business conditions for the first part of the year have failed to bear out pessimistic predictions, production in the basic industries continues at a record rate and the prospect of any serious break in the situation has become correspondingly remote.

George H. Jones, chairman of the board of the Standard Oil Co. of New Jersey, speaking at the Robert Treat Hotel, Newark, N. J., April 28, at a meeting of company officials with the old and new representatives elected by the men in the three New Jersey refineries under the provisions of the industrial representation plan, said the outlook for business for the country in general is favorable, and that it is apparent that any recession should it occur between now and the end of the year would be moderate and orderly. His address follows in part:

Growing Confidence

"The abnormal fluctuations in business activity, which characterized the war period and the years immediately succeeding the armistice, are not, we hope, soon to be repeated. Nevertheless, we must expect that in our industry, as in business as a whole, there will be alternating periods of greater and lesser activity and of higher and lower returns.

"In 1925 American business experienced what was probably, all things considered, the most prosperous year in its history. Demands of domestic consumers created a broad and continuous market for the products of nearly every branch of industry. Most corporations made satisfactory profits. There was practically no unemployment, and the earnings of labor were higher in purchasing power than ever before. Yet we are faced with this extraordinary fact: In spite of the unexampled industrial activity and the easy money conditions with which it was accompanied during the greater part of the year, commodity prices generally tended downward. Stocks of raw materials and finished products were held in moderate quantities, and managers were forced to be increasingly watchful in regard to costs. Inflation and speculative activity were strikingly absent, so far as concerned ordinary business and industry.

"Thus far the outlook for the present year is generally favorable. Industrial activity is continuing at a high rate. The leading steel companies are operating almost up to their theoretical capacity. The March production of motor cars and trucks totaled 447,185, a record for that month. The corresponding production for the first three months of the year was also a new record amounting, as it did, to 1,138,409 cars and trucks. Railroad traffic, as measured by the weekly reports of freight car loadings, is holding up to high levels. In the building industry, the contracts actually awarded in 37 states of the Rocky Mountains, during the first quarter called for the expenditure of $1,444,900,000, or a gain of 30 per cent over the same months last year.

"The attitude of leading industrial managers, so far as we have been able to learn it, is one of conservative optimism. Everywhere is found a growing confidence that if any recession in business activity takes place between now and the end of the year it will be moderate and orderly, and will not seriously affect the earnings of either wage earners or stockholders.

Faith in the Future

"The production of crude oil in the world last year was 1,060,000,000 bbls., or 2,903,000 bbls. daily; the production in the United States was 764,000,000 bbls., or 2,094,000 bbls. daily. The United States produced 72 per cent of the world's production.

"From the time of the dissolution in 1911 to the present, our company has earned $1,110,000,000. What has it done with it? The sum of $147,000,000 was paid to the Federal Government in taxes; $397,000,000 was paid out in dividends, and $566,000,000 was reinvested in the property; in other words, 13 per cent in taxes to the United States, 36 per cent in dividends and 51 per cent put back in the property.

"The past five years has been a period of depression in the industry, but in spite of it, we earned our dividends and reinvested approximately $160,000,000 in the property. I could give you many more details about the business, but time will not permit.

"Whatever may be the degree of success that our combined efforts will attain in the year that lies ahead, I have faith that we can face the future hopefully and with confidence if we cooperate loyally as fellow workers in the service of the company and the public. In such a gathering as this, there is no question of capital and labor. We are all employes, some identified with the management and others identified more directly with production.

"There are time when we have perhaps allowed ourselves to feel that our jobs count for little in the success of the company; yet no matter what the value of any business measured in brick and mortar, that part is negligible compared with the value of every man in his place coordinated into an effective whole. No man is so important as to be the whole works. None is too unimportant to be a spoke in a wheel. The employer should realize his responsibility to his employes. He should study their ambitions and their desires and share with them their sorrows and their successes. On the other hand, labor should recognize its responsibilities. It should realize that in a great measure, it is up to the employes to make the business either a success or a failure. And we should all remember that upon the success of the business depends the earnings of employes and stockholders alike.

Fundamentals in Economics

"Wages and dividends are both paid out of production, and production is brought about by the use of brain and muscle. Thus labor to a great extent pays its own wages, since wage rates on the average and in the long run are determined mainly by the value of the worker's efforts and of the commodities which these efforts help to produce.

"The benefits of the increased wealth produced by industry are shared between labor, capital and the consumer. When one group receives more than its share, that can only be done at the expense of other groups. These are fundamentals in economics. They have grown out of 6,000 years of experience.

"Have you ever wondered why the American wage-earner receives, as measured by the purchasing power of his wages, almost twice as much as the worker in England, perhaps, three or four times as much as the workers in some other countries of Europe, and many times as much as the workers in Asia or Africa? It is partly because he works harder and faster and more efficiently. Also, it is partly because he is better nourished, better clothed and better housed, and therefore builds up greater physical and mental vigor. But there is yet another reason which is to be found in the greater amounts of capital, and of natural resources which are backing up the American laborer in his work. The American worker is able to accomplish much and earn high wages, because he is in fact, the director of natural forces and powerful machinery which multiply many times the effect of his efforts. Plants and machinery, and facilities for the distribution of power, represent capital, and capital is mainly stored up surplus left over from the products of industry."

CRUDE OIL STOCKS WERE REDUCED 1,500,000 BARRELS DURING MARCH

By Charles E. Kern
Washington Bureau, The Oil and Gas Journal

WASHINGTON, D. C., May 4.—The production of crude petroleum in the United States for March, as compiled by G. R. Hopkins, petroleum economist, from pipe line reports to the Bureau of Mines, amounted to 60,492,000 bbls., a daily average of 1,951,000 bbls. This represents an increase over February production of 2,500 bbls. per day, made up roughly of a 10,000-bbl. increase in light oil and a 7,500-bbl. decrease in heavy oil production.

All the major producing areas of the country, except California and the Texas Gulf Coast showed some increase in daily average production. Perhaps the greatest outstanding event of the month was the rise in importance of the Urania Field, in northern Louisiana, there being over 180,000 bbls. shipped out during the month. Production in Montana set a record figure and more than compensated for the drop in the Salt Creek Field. The production in Arkansas continued to decline, although the decreased rate would indicate that the Smackover Field was becoming settled.

Total stocks east of California again declined, though the decrease, which amounted to 265,000 bbls., was considerably under that of any month back to May, 1925. Refinery stocks were increased roughly 1,200,000 bbls. This decrease in crude stocks (265,000 bbls.) and increase in refined stocks (1,200,000 bbls.) is approximately equivalent to a reduction in crude stocks of 1,500,000 bbls. As has been the case each month for a year and a half, stocks of heavy crude and fuel oil in California reached a new high level. Refinable crude in this State, however, decreased.

Increased cooperation on the part of the refiners has made it possible to make a complete separation as between light and heavy crude east of California. These figures for March are: Light crude, 227,928,000 bbls., or 79 per cent; heavy crude, 59,782,000 bbls., or 21 per cent. Shipments of crude through the Panama Canal fell off but refined oil cargoes increased almost 1,000,000 bbls.

Runs to stills of crude petroleum during the month of March amounted to 62,493,000 bbls., of which 3,868,000 bbls. was foreign crude petroleum. This represents an increase in daily average of crude runs of a little over 5,000 bbls.

Gasoline production for the month totaled 969,543,000 gallons; a daily average of 31,276,000 gallons, or an increase of 436,000 gallons per day, or 1.4 per cent over the February rate. Domestic consumption amounted to 779,571,000 gallons, a daily average of 25,147,000 gallons, or an increase of 8 per cent over the previous month and of 25 per cent over March, 1925. Stocks, however, continued to rise, the total for the month, 1,936,336,000 gallons, being an increase over February of 78,000,000 gallons. On the usual basis these stocks represent 73 days' supply, which compares with 75 days' supply on hand the previous month and 81 days' supply on hand March 31, 1925.

Stocks of kerosene were added to as production of this commodity increased. Stocks of lubricants fell off as domestic demand rose sharply. Stocks of gas and fuel oils were again drawn on extensively as cracking activity increased.

The refinery figures of this report were compiled from schedule of 323 refiners which operated during March at 78 per cent of their recorded daily crude oil capacity of 2,577,000 bbls.

Possible Effects Of British Strike On Exports of Oil

By N. O. Fanning
New York Bureau, The Oil and Gas Journal, 30 Church St., New York

NEW YORK, May 4.—The British strike will not affect the unloading of tankers at British ports but it is expected to interfere seriously with the shipment of oil products from terminals to distributing points inland. Most of the oil is shipped in tank cars and this cannot be continued so long as the railroads are tied up. The probability is that British factors will halt further exports from the United States as it is understood coastal terminals are well filled in preparation for spring.

No oil men can predict the duration of the strike. Attempts are being made to substitute truck and bus service for railroads in England but it is said this is being opposed. Oil men here are not willing to admit the seriousness of the situation until they know how long the strike is going to last.

England gets considerable lubricating oil in barrels and these cannot be unloaded under strike conditions. Therefore, all shipments to England during the strike will be in bulk tankers. A coal strike would have benefited the oil business in the end but the general strike complicates the situation.

WILL DRILL DEEPER

MEXIA, Tex., May 3.—After bailing and swabbing its test on the Ross farm, 5 miles west of Mexia, and getting nothing but water, the Transcontinental Oil Co. decided to pull the 4½-inch casing and drill deeper. Interest taken in the well last week has subsided, and there is much less confidence in the success of the operation than had prevailed for the past two weeks or more.

Reinvested Earnings Oil Insurance

Ten Representative Companies Put Back 60 Per Cent for Additions and Improvements. Pursue Conservative Policy

By N. O. Fanning

New York Bureau, The Oil and Gas Journal, 30 Church St., New York

NEW YORK, Apr. 26.—Conservation in the petroleum industry can be, and in fact is, carried beyond the confines of actual manufacturing or selling operations. It can be, and is, practiced in the financial operations of the petroleum companies, particularly with regard to their dividend policy.

The money which an oil company earns but does not pay out in dividends as a rule goes back into additions and betterments. This is the only source of funds which can be used for this purpose in addition to the original capital invested, on which a company does not have to pay interest. The failure to reinvest earnings in property or improvements has been found to be reflected in a reactionary tendency, just as with regard to an individual, failure to save often is accompanied by a decline in morale.

Corporations can borrow money for betterments, but on such funds they usually have to pay interest. The only case in which interest is not practically compulsory is where common or preferred stock is issued, but there is apparently a moral obligation in such a case because purchasers of stock, either common or preferred, do so in expectation of receiving dividends sooner or later, even if none is being paid at the time the stock is purchased.

It can be seen, however, that where actual money earned is reinvested in improvements resulting in more economical operation, such reinvestment has a direct relation to conservation, and it can be stated that as a rule money not paid out in dividends is apt to be put more in improvements than in additions.

The relation of dividend policy to conservation is brought up particularly in the report of Judge Gary, chairman of the board of directors of the United States Steel Corp., at the annual meeting of the corporation held recently. He says with regard to reinvestment of current earnings: "In order to properly take care of our natural and legitimate customers, and to protect our stockholders generally, we must expend large sums from year to year. For one, I wish we could reasonably expend less to keep our properties and business in good condition; but we cannot. Personally, I would like to see larger dividends, if practicable and proper, but what have personal or individual interests to do with our subject, unless the whole body of stockholders is at the same time protected? Our need for large liquid assets is great. We must be prepared for emergencies. Business fluctuates. Selling prices are uncertain. Competition and fairness to customers require the best and latest improvements in facilities and methods. Machinery wears out rapidly, and new and better designs compel replacements and substitutions."

Dividend policy is one of the most difficult problems for the board of directors of a large company with many stockholders to decide. There are always some stockholders who believe that they are not receiving large enough dividends, especially when they see that a company is earning considerably more than it is actually paying out to its stockholders.

This is a question which many of the larger oil companies have had to meet. The more conservative a company's dividend policy is, of course, the greater the criticism.

The directors of the oil companies are between two fires with regard to dividends. Reinvestment of earnings is, of course, a virtue, but the credit of an industry and its ability to demand respect as a profitable business is more often than otherwise judged by its ability to pay liberal dividends.

Oil Record Creditable

In a discussion of the oil industry's record, attention must be given to the larger units of the business that have a record of a number of years, rather than to smaller companies which may have struck oil and be paying 1,000 per cent on a very small capital stock. As a rule the average investor has little of the stock of such a company; these companies are the exception, rather than the rule.

Apparently the policy of the larger oil organizations is to fix a dividend rate which can probably be continued over a number of years without change, rather than to raise dividends in time of prosperity and reduce them in time of depression. It is not always true, of course, but in many instances the history of oil companies shows that when a dividend has been raised the new rate could be regarded as permanent. This is in contrast to the policy of the United States Steel Corp., for instance, which declares extra dividends when conditions justify them, and discontinue them when conditions no longer appear to warrant the higher rate.

The financial executives of some of the largest oil organizations have preferred to be superconservative, regarding the oil business as somewhat speculative. The policy of the Standard Oil companies until 1919 was to finance all betterments and additions from surplus earnings. In that year the Standard Oil Co. of New Jersey and the Atlantic Refining Co. announced plans to do outside financing, and they created preferred stock which was offered to common stockholders at par.

Subsequent years have witnessed an apparent departure on the part of other Standard Oil units from the old hard and fast rule, and several have issued additional stock or bonds for the purpose of taking care of capital expenditures.

As money raised in this manner involves payment of additional interest or dividends, the dividend policy on the original capital or common stock has tended to continue on an ultraconservative basis. For instance, the Standard Oil Co. of New Jersey is paying annual dividends on its common stock not much in excess of the amount paid in 1912, the year following the dissolution. Stockholders are receiving exactly the same amount as they received then, but there have been small increases in common shares due to employes' stock subscriptions, which has brought the total up somewhat. The company is paying much more in dividends, however, inasmuch as the dividend requirements on its preferred stock amount to about $14,000,000 annually, and this preferred stock did not exist prior to 1919. Dividend requirements on the common stock are running at approximately $20,000,000 a year, which is equivalent to the $20 per share paid on approximately 1,000,000 shares from 1912 to 1919, inclusive.

As a result of the conservative dividend policy pursued by the company, however, it is estimated that some $400,000,000 was put back into the property between 1912 and 1919 from surplus earnings, and more has been reinvested since then. If this money had been borrowed, say at the ridiculously low rate of 4 per cent, the annual interest requirements would now amount to $16,000,000.

The record of the oil business generally shows that the industry is putting large sums back into property, and that dividend payments, while liberal from the viewpoint of original holders, are certainly not excessive.

Sixty Per Cent Reinvested

The showings by individual companies were as follows:

	1925		
	Net Earnings	Dividends	Carried in Surplus
Humble Oil & Refining Co.	$ 22,623,789	$ 2,100,000	$ 20,523,789
Standard Oil of Indiana	52,932,648	22,521,638	30,411,010
Vacuum Oil	24,230,091	12,424,615	11,805,476
Standard Oil of California	30,953,485	18,927,027	12,026,458
Standard Oil of Ohio	3,455,422	1,890,000	1,565,422
Total	$134,195,435	$ 57,863,280	$ 76,332,155
Associated Oil	$ 10,465,249	$ 4,200,000	$ 6,265,249
California Petroleum	6,294,852	2,419,168	3,875,684
Gulf Oil	35,000,761	6,554,732	28,446,029
Marland Oil	14,799,069	4,579,874	10,219,195
The Texas Company	39,605,078	19,734,000	19,871,078
Total	$106,165,009	$ 37,487,774	$ 68,677,235
Ten companies	$240,360,444	$ 95,351,054	$145,009,390

Ten representative oil companies that have reported for 1925 earned $240,360,444 net on their common or preferred stocks in that year. Of this amount, $145,009,390. or 60 per cent, was carried to surplus, which usually means that it was set aside for reinvestment in additions or improvements. Dividends paid during the year amounted to $95,351,054, or 40 per cent.

Five Standard Oil companies earned $134,195,435 net in 1925, and paid $57,863,280 in dividends, carrying $76,332,155, or 56.9 per cent of their earnings, to surplus.

Five independent companies earned $106,165,009 net during 1925, paid $37,487,774 in dividends and carried forward $68,677,235, or 64.7, per cent to surplus.

Where sums are carried to surplus they are rarely kept in cash form, but are converted into fixed forms. For this reason, cash dividends are rarely paid out of surplus, but instead, stock dividends are declared, which have the effect merely of issuing stock against the increased assets of the company represented by reinvestment of surplus earnings.

Conservation and Dividends

With the oil business awaiting a Federal oil conservation report, and the industry itself striving to conserve in many directions the dividend policies of the big companies should be regarded as worthy of mention, at least.

The trend in the oil business, furthermore, is toward the development of improved scientific methods in oil recovery and refining. The carrying out of these methods requires the expenditure of a considerable amount of money, and it is only the company that has the money that can afford to do so. The sums actually spent on laboratory work and experimentation by a concern like Standard Oil Co. of New Jersey would go into hundreds of thousands annually. These, however, result in savings greatly exceeding the costs.

Oil companies having a successful record over a decade or more have all had conservative dividend policies. The effect of the placing back into property of a large percentage of earnings, in fact, has been incalculable in assuring the continued prosperity of the oil business, if not its very existence.

GENERAL RULE ON AIR PRESSURE FAVORED BY TEXAS COMMISSION

WICHITA FALLS, Tex., May 1.—More than 50 operators, many of them representing the larger companies, who met here Friday with Judge H. E. Bell, chief supervisor of the oil and gas division of the Railroad Commission, and Commissioner C. V. Terrell, decided upon suggestion of Judge Bell, at the conclusion of the hearing, that a general rule governing the use of air pressure in oil wells would be satisfactory.

It was announced that the rule should embrace the restrictions that no one should apply air pressure to oil or gas sands without first obtaining a permit from the commission, issued after due notice had been given and a hearing held and all interested persons given an opportunity to present their rights. Judge Bell announced that the rule should be in the interest of conservation and with due regard to the equitable rights of others.

Judge Bell requested all operators present at the hearing, held in the directors' room of the Chamber of Commerce, to submit a rule which, in their opinion, would serve the best interests of the oil industry and accompany it with a letter of explanation setting forth the reason. He asked that as many as possible submit a sample rule before his departure Friday night, but if unable to do this to forward it at once to his office in Austin.

A rule governing the application of air pressure to oil and gas sands is to be included in the new code of rules now being drafted by the Railroad Commission.

Commissioner C. V. Terrell, at the conclusion of the hearing, spoke briefly to the operators and expressed his appreciation of the co-operation which the commission had received in its work from the oil men.

"Bill" Long, Oil and Gas Man, Supply Man and Poet, Passes On

W. G. Long, of Tulsa, one of the most widely known men in the oil business, died Friday, April 30, at Sand Springs hospital, where he had undergone an operation which disclosed a hopeless condition.

"Bill" Long was 61 years of age and he spent his whole life in the oil country and took part in the discovery or the development of many fields. Wells were being drilled on his grandfather's farm near Parkers Landing when he was a little boy and the work had a fascination for him and after he had grown to young manhood and spent two years in Allegheny College at Meadville, he decided

(Continued on Page 185)

Factors Affecting Refinery Operations

Survey of Three Years Clearly Shows Mutual Dependence of Prices and Yields. Gasoline Increasing in Importance

By C. O. Willson

Of a total estimated gross income of $2,350,937,813 based on tank car sales received by refiners last year, $1,287,257,122 or 54.7 per cent was obtained from the sale of gasoline. The revenue from the sale of gasoline was not only much greater than during 1924 or 1923 but the percentage of the total income from that product in 1925 was greater than during either of the previous years. The revenue for 1925 compares with a return of $936,560,462 (51.4 per cent of total) for 1924 and $855,351,314 (52.8 per cent of total) in 1923.

This increasing importance of gasoline contrasts with the situation in regard to fuel and gas oils when considered for the same 3-year period. Although fuel and gas oils represented almost 50 per cent in volume (49.1 per cent) of the total crude charge to stills in 1925 the percentage of total return to refiners was only 22.9 per cent. This is less than in 1924 when the revenue derived from fuel and gas oils was 25.7 per cent of the total. It is also less than the 24.4 per cent of 1923.

These comparative data of special significance to the refining fraternity together with other information are obtainable from the accompanying tables Nos. 1 and 2. Table 1 gives the production with estimated returns for all refined products by areas for the years 1923, 1924 and 1925. From this datum the percentage figures were obtained showing the relative importance of all products as shown in Table 2.

These tables were prepared for the primary purpose of determining what effect the known changes in manufacturing methods were having on the relative value of products secured by the refiners in their operations.

It is generally known that due to cracking, the use of natural gasoline and more efficient fractionation (in skimming processes) that more and more gasoline is being obtained for each barrel of crude oil produced. This is shown in Table 2 where the gasoline recovery based on crude runs to stills was increased from 30.9 per cent in 1923, to 33.1 per cent in 1924, and 34.9 per cent in 1925.

Judged by comment occasionally heard from those outside the refining fraternity, it is assumed that this increased recovery of gasoline has meant a corresponding increase in refinery profits. It is true that part of the increased gasoline yields is being secured without any additional operating costs. However, the greater part of the increased recovery is due to cracking and use of natural gasoline and this necessarily means a greater cost per barrel of crude oil refined due both to a larger investment and increased daily operating expense. Taking these facts into consideration as will be shown later the advantage accuring to the refiner from the greater efficiency is so small that his chances of profit are probably no better than they were a few years ago.

Explanation of Tables

Before passing to a discussion of the tables an explanation of the manner in which they were obtained is necessary. The data covering the production of the various products is based on the Bureau of Mines report. The prices were derived from the weekly quotations of The Oil and Gas Journal based on tank car quotations. Those acquainted with divisions made by the Government bureau in its reports and who are also familiar with the available quotations on refined products will realize that an absolute check on sales would be impossible except through a report from each company.

In comparing the average prices some will probably feel that lubricating oils are priced too low. It is more difficult to determine average values for this product than any other obtained in refining. Prices vary in the several refining areas and in a given area the quotations vary with the numerous grades. Some of the low grade cylinder stocks or neutral oils are available for a few cents a gallon while the best grades bring as high as 50 cents a gallon in tank car lots. The prices used in the tables do not take into consideration package goods.

Prices on all products in tank car lots are easily determined for the Mid-Continent and some other refining centers. However, in other areas, a large part of the plant output is sold through long-time contracts or is distributed direct by the marketing department of the refinery organization.

Other plants are scattered and base their prices on quotations from large refining areas in which there is a surplus output which has to be marketed long distances from the plant. In these cases the refiner is able to benefit from a freight advantage over his competitor in part of his sales but in remaining sales is compelled to absorb the freight advantage which other competitors have.

The Bureau of Mines report also does not state just what refineries are included in the several general areas. However, with a definite knowledge of prices covering a majority of the refineries it is possible by taking into consideration freight rates and general marketing conditions to closely approximate average prices in the remaining areas. This was done in a survey covering the entire United States with results as shown in Tables 1 and 2.

Factors in Revenue

In considering the data given in the tables it should be kept in mind that total refinery revenue depends on the amount of crude runs to stills, the percentage yields of the several products secured in the refinery processing and finally the price received per unit of finished product. Another factor over which the refiner has no direct control is the price paid for the crude oil.

In regard to the first as is generally known crude runs to stills for the entire United States has shown a steady climb. In 1923, the crude runs totaled 581,238 bbls., 643,719 bbls. in 1924 and 740,004 bbls. in 1925. The greater part of the increased revenue from year to year shown in the tables is due to the fact that refiners increased the volume of their output. This is a development which has no significance in itself as indicating the status of the industry's losses or profits from a year's operations.

Yields and prices are the two factors around which profitable operations center and the two in refinery operations are so closely allied that it is impossible to consider the one without the other. Yields vary in the operations of individual plants as do the prices obtained for the products by the sales departments of the same organizations. Conditions affecting yields are not the same in one section as in others and for that reason it is just as impossible to establish a standard for yields as it would be for prices.

As previously explained the trend in refinery operations has been to secure a greater yield of gasoline per barrel of crude oil. This has been due to the fact that the demand for gasoline has shown the greatest increase with higher prices prevailing than for any other product with the exception of lubricating oils.

The increased recovery of gasoline from crude oil has been secured in the past with a lowering of kerosene or gas and fuel oils yields or both. These other main products from crude oil are of less value from a marketing standpoint and

(Continued on Page 150)

TABLE 1—PRODUCTION AND ESTIMATED VALUE OF REFINED PRODUCTS, BY AREAS, IN UNITED STATES, BASED ON TANK CAR PRICES, F.O.B. REFINERIES, FOR THE YEARS 1923, 1924 AND 1925

	Gasoline			Kerosene			Gas and Fuel Oils			Lubricants			Wax			*Other
	Thousands of Gallons			Thousands of Gallons			Thousands of Gallons			Thousands of Gallons			Thousands of Pounds			
	Price	Production	Val., Dollars	Price	Production	Value	Price	Production	Value	Price	Production	Value	Price	Production	Value	Value
1925—																
East Coast	.1465	1,744,120	$ 255,513,580	.0656	573,915	$37,648,824	1.725	2,474,872	$101,646,527	.18	385,937	$69,468,660	.0612	230,902	$14,131,202	$18,011,570
Appalachian	.1348	426,470	57,488,156	.0656	143,110	9,388,016	2.226	241,947	12,823,191	.18	189,467	34,314,720	.0612	32,181	1,969,477	2,296,740
Ind., Ill. etc.	.1205	1,461,600	176,122,800	.0595	257,523	15,322,619	1.74	777,426	32,207,649	.14	134,707	18,858,980	.05	81,213	4,060,650	13,986,330
Okla.-Kans.	.1062	2,015,096	214,063,195	.0445	381,771	16,988,809	1.12	1,559,373	40,169,442	.13	105,740	13,746,200	.0516	48,970	2,526,852	8,291,150
N. and C. Texas	.1056	564,333	59,593,565	.0445	99,869	4,444,171	1.1765	731,780	20,498,551	.11	21,541	2,369,510	.0516	4,333	223,583	9,062,960
Texas G. C.	.1191	1,667,152	198,557,803	.058	461,246	26,752,268	1.5872	2,041,604	77,153,187	13.5	302,527	40,841,146	.06	56,215	3,372,900	19,623,060
N. Louisiana-Ark.	.113	130,966	14,799,158	.047	28,209	1,325,823	1.1765	474,792	13,299,828	.12	2,468	296,160	.0516			5,168,690
La. Gulf Coast	.1191	498,853	59,413,392	.058	201,139	11,666,062	1.5872	1,094,235	41,351,661	.13	30,832	4,008,160	.06	41,513	2,490,780	20,211,390
Rocky Mountain	.118	611,654	72,175,172	.057	92,697	5,283,729	1.59	470,761	17,821,666	13.5	24,650	3,337,750	.05	45,084	2,251,700	16,482,920
California	.1017	1,765,883	179,590,301	.075	270,855	20,314,125	1.4068	5,412,282	181,285,674	.14	103,147	14,440,580				38,145,050
Total value		10,886,127	1,287,257,122		2,510,334	$150,134,446		15,279,072	$538,557,376		1,301,016	$201,681,865		590,361	31,027,144	$142,279,860
Total U. S.			$2,350,937,813	Total crude runs to stills; 740,004 bbls.; average value, $3.177 per barrel.												
1924—																
East Coast	.1316	1,678,128	$ 220,841,645	.0671	577,193	$38,729,650	1.6934	2,856,440	$115,168,940	.184	338,686	$62,318,224	.0550	198,947	$10,942,085	$13,835,946
Pennsylvania	.1224	349,269	42,750,526	.0671	146,790	9,849,609	2.2134	192,289	10,133,630	.188	179,149	33,680,012	.0550	80,811	4,444,605	1,650,718
Ind. and Ill.	.1064	1,176,188	125,146,403	.0599	239,513	14,346,829	1.804	734,150	29,733,075	.145	105,574	15,308,230	.0440	56,016	3,464,704	7,726,068
Okla.-Kans.	.0902	1,519,857	137,091,101	.0445	341,187	15,182,822	1.27	1,347,975	32,620,995	.134	93,223	12,491,882	.0446	49,456	2,205,738	1,835,658
Texas	.1004	1,733,333	174,026,533	.0554	559,033	30,970,428	1.477	2,437,921	87,377,571	.115	279,960	32,195,400	.0540	56,845	3,069,630	8,205,027
La. and Ark.	.0971	523,504	50,638,038	.0471	259,950	12,245,058	.947	967,421	32,011,638	.140	31,936	4,478,040	.0530	40,226	2,131,660	17,991,203
Colorado and Wyo.	.1021	639,679	65,311,226	.0524	99,395	5,203,058	1.454	526,671	18,323,849	.137	19,729	2,702,873	.0440	34,113	1,500,972	9,634,348
California	.0900	1,341,721	120,754,890	.077	298,117	22,955,009	1.38	4,397,101	144,476,176	.14	106,618	14,926,520				
Total		8,959,679	936,560,462		2,521,108	$149,482,463		13,459,968	$469,649,871		1,154,925	$178,101,181		516,408	$26,759,394	$60,878,968
Total value U. S.			$1,821,432,337	Total crude runs to stills, 643,719 bbls.; average value, $2.839 per barrel.												
1923—																
East Coast	.1388	1,399,641	$ 194,270,274	.0742	566,079	$42,003,069	1.569	2,412,659	$90,474,747	.178	313,978	$55,888,212	.0325	184,781	$ 6,005,388	$12,028,023
Pennsylvania	.1352	315,360	42,636,777	.0684	151,462	10,360,005	2.31	201,075	11,059,150	.181	167,511	30,319,633	.0319	77,307	2,466,100	1,212,684
Ind. and Ill.	.111	1,015,323	112,700,957	.0541	216,899	11,734,244	1.70	665,785	26,964,299	.142	106,088	15,064,554	.025	37,068	926,452	5,370,615
Okla.-Kans.	.0985	1,255,269	123,644,085	.0423	280,525	11,866,248	1.01	1,264,672	30,352,137	.137	82,141	11,253,379	.0254	35,667	905,691	1,266,258
Texas	.1051	1,221,475	128,377,100	.0480	535,784	25,717,651	1.247	2,117,900	62,901,658	.112	235,951	26,426,552	.0275	52,777	1,451,371	3,292,914
La. and Ark.	.106	433,462	45,947,025	.0472	255,063	12,038,975	1.113	728,593	19,307,728	.136	25,677	3,492,155	.0269	46,902	1,261,688	12,607,119
Colo.-Wyo.	.1135	632,210	71,755,879	.0548	126,980	6,958,542	1.151	584,225	21,032,110	.132	19,173	2,530,873	.024	31,984	767,637	479,525
California	.106	1,283,200	136,019,217	.072	216,140	15,562,163	1.35	4,099,279	132,406,713	.134	96,845	12,927,312	.026	179	4,658	23,675,522
Total value		7,555,945	$ 855,351,314		2,348,934	$136,240,837		12,074,191	$394,498,545	.15	1,097,368	$157,902,670		446,646	$13,788,985	$59,932,660
Total value U. S.			$1,617,715,011	Total crude runs to stills, 581,238 bbls.; average value, $2.792 per barrel.												

*Includes coke, asphalt, finished and unfinished oils.

TABLE 2—RECAPITULATION BASED ON TABLE 1, SHOWING PRODUCTION AVERAGE PRICES PER UNIT AND TOTAL VALUES WITH PERCENTAGES OF REFINED PRODUCTS FOR THE YEARS 1923, 1924 AND 1925

	1925				1924				1923			
	x Production	Pctg.	Av. Price per Unit	Value	Pctg.	x Production	Pctg.	Av. Price per Unit	Value	Pctg.	x Production	Pctg.	Av. Price per Unit	Value	Pctg.
Gasoline	10,886,127	34.9	.1182	$1,287,257,122	54.7	8,959,679	33.1	.1045	$ 936,560,462	51.4	7,555,945	30.9	.1132	$ 855,351,314	52.8
Kerosene	2,510,334	8.0	.0594	150,134,446	6.4	2,521,108	9.3	.0593	149,482,463	8.2	2,348,934	9.5	.0580	136,240,837	8.4
Gas and fuel oils	15,279,072	49.1	.0352	538,557,376	22.9	13,459,968	49.8	.0348	469,649,871	25.7	12,074,191	49.5	.0325	394,498,545	24.4
Lubricants	1,301,016	4.2	.155	201,681,865	8.8	1,154,925	4.3	.154	178,101,181	9.8	1,097,368	4.5	.1439	157,902,670	9.7
Wax (pounds)	590,361	*3.8	.0525	31,027,144	1.3	516,408	*3.5	.0518	26,759,394	1.4	466,646	*5.6	.0291	13,788,985	.85
Coke (tons)	991			†142,279,860	6.5	761			†60,878,968	3.4	672			†59,932,660	3.7
Other refined oils	339,891					346,580					213,626				
Unfinished oils	1,260,883					138,228					32,148				
Asphalt (tons)	2,633					2,546					2,327				
Total				$2,350,937,813					$1,821,432,337					$1,617,715,011	

x In thousands of gallons. *All remaining products including losses. †All remaining products.

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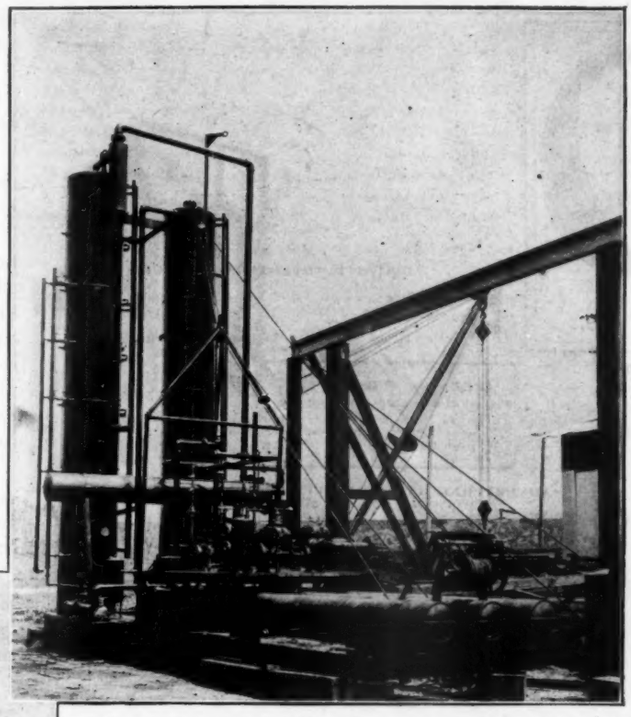

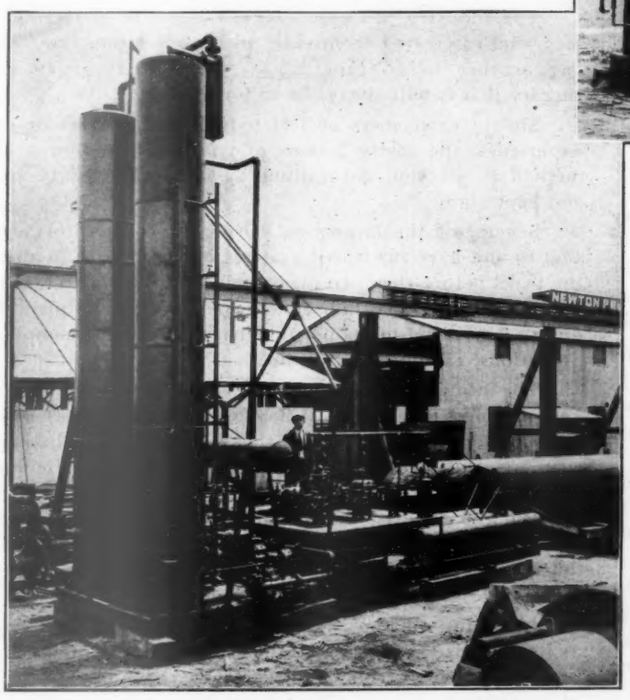

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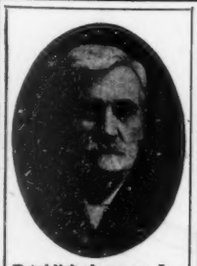

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USING IMPROVEMENTS

"Looking through the pages of The Oil and Gas Journal," said a subscriber visiting the offices last week, "I am impressed by a thought that may not yet have occurred to many in the oil industry but that is certain to be brought home to them in the very near future. This is the increasing technical complexity of its operations and the resultant need for increasing technical knowledge among those engaged in it."

"The point I want to emphasize," he added, "is this: As the columns of The Oil and Gas Journal show, the industry is being continually offered improvements in equipment and methods, most of them the product of laborious investigation and scientific study, designed to attain yet greater efficiency in the production and refining of oil. The industry spends millions of dollars installing these improvements, but is it seeing that those who use these improvements are correspondingly qualified to get the advantage from them?

"Take that article by H. S. Bell, in the April 22 issue of The Journal, on preventing steam losses at refineries. The whole application in the last analysis is up to the men who do the work. If they should happen to be of the type which has been accustomed to doing a thing one way and averse to 'newfangled notions,' either balky, indifferent or unqualified by lack of knowledge to adopt new methods, what is the chance of any more prevention of steam losses?

"That is just an illustration," the commentator added, "but anybody can see its application to any of the improvements added to a plant of any kind. I tell you the industry has got to give as much thought to training men to get the benefit of improvements as it has been giving to installing the improvements themselves."

Come to think of it, there is much force in this suggestion. Its importance will be evident alike to oil men and to manufacturers of oil equipment for field and refinery. Both are interested in getting the fullest results from improvements installed. The man who sells an improvement wants to see it given a fair and full trial and the man who buys it to do a certain thing wants to see it do it.

Turned over to men who may be, as the critic said, "balky, indifferent, or unqualified" to get what the improvement is good for out of it, a really meritorious article may be condemned as worthless, the manufacturer denied his fair trial and the buyer deprived of an advantage he might have had with more competent help.

Instances have been known where equipment was approved by the engineer, ordered by the purchasing department and shipped to the field or plant where a report of poor results was made, yet when the manufacturer had to send his own men to demonstrate its efficiency and thereafter obtained the proper cooperation at the field or plant it proved a valuable acquisition.

The special importance of this subject to the oil industry is emphasized by the extraordinarily rapid advance of its technical and scientific operations in the past few years.

It is not, of course, to be inferred that the industry should be manned exclusively by technological graduates. The training and education in mind is rather in practical application.

It has been one of the remarkable facts about the oil industry how splendidly those who have been engaged in it for years have adapted themselves to changing conditions and methods. They have kept pace with every advance in the technique of production. They have managed to translate the terms of the geologists, for example, into everyday conversation. They have mastered the practical application of theories evolved in laboratories they never saw. They have been willing to try new ideas, new apparatus, submitting them to the test of actual performance and judging by results.

In the refining and natural gasoline branches the industry has been fortunate also in enlisting men of capacity to apply principles and methods understood technically perhaps only by the engineer, the technologist and the chemist.

The industry has been lucky, indeed, in attracting a class of men who interested themselves in its operations, not the "another day, another dollar" type. But as the industry grows, is there assurance that it will always be so fortunate?

Should newcomers be left to the slow process of learning by experience, the costly lessons of trial and error, or is there some method of selection and training by which they can be started right and kept right.

Several of the largest oil corporations have foreseen this necessity and have instituted systems of training to fit their men for the tasks before them. In many industries the matter of training is left to the individual himself on the sink-or-swim plan. The oil industry, by reason of its peculiar hazards and the complexity of its operations, cannot afford to do that.

The utmost in efficiency is necessitated by the exceptionally keen competition in the oil business. The ceaseless search for improved ways of doing this or that is an effect of this competition, that and the pride of achievement, which is particularly strong among oil men.

But the scientists and technologists who perfect new methods and the manufacturers who produce new equipment and apparatus must have intelligent application and support in actual operations if the fullest benefits are to be gained.

Installing an improvement is only a beginning. The real test of its value is the use made of it and the results obtained.

More efficient methods have always redounded to the advantage of everyone concerned. They have increased output, cut costs and thereby enlarged the market with correspondingly increased returns to all engaged.

The Oil and Gas Journal has been devoting considerable space to the practical and technical problems of the industry, largely with the hope of assisting those engaged in it to become more efficient and qualified for advancement. No man knows his own industry or business so completely that he cannot profit from the experiments and experience of others.

In the present era of accelerated development in the oil industry, there is no room for "pull backs" or those who balk at innovations. To the ability to do things in the old way must be added the willingness to try the new. The man who fails will find himself left behind in the irresistible march of progress.

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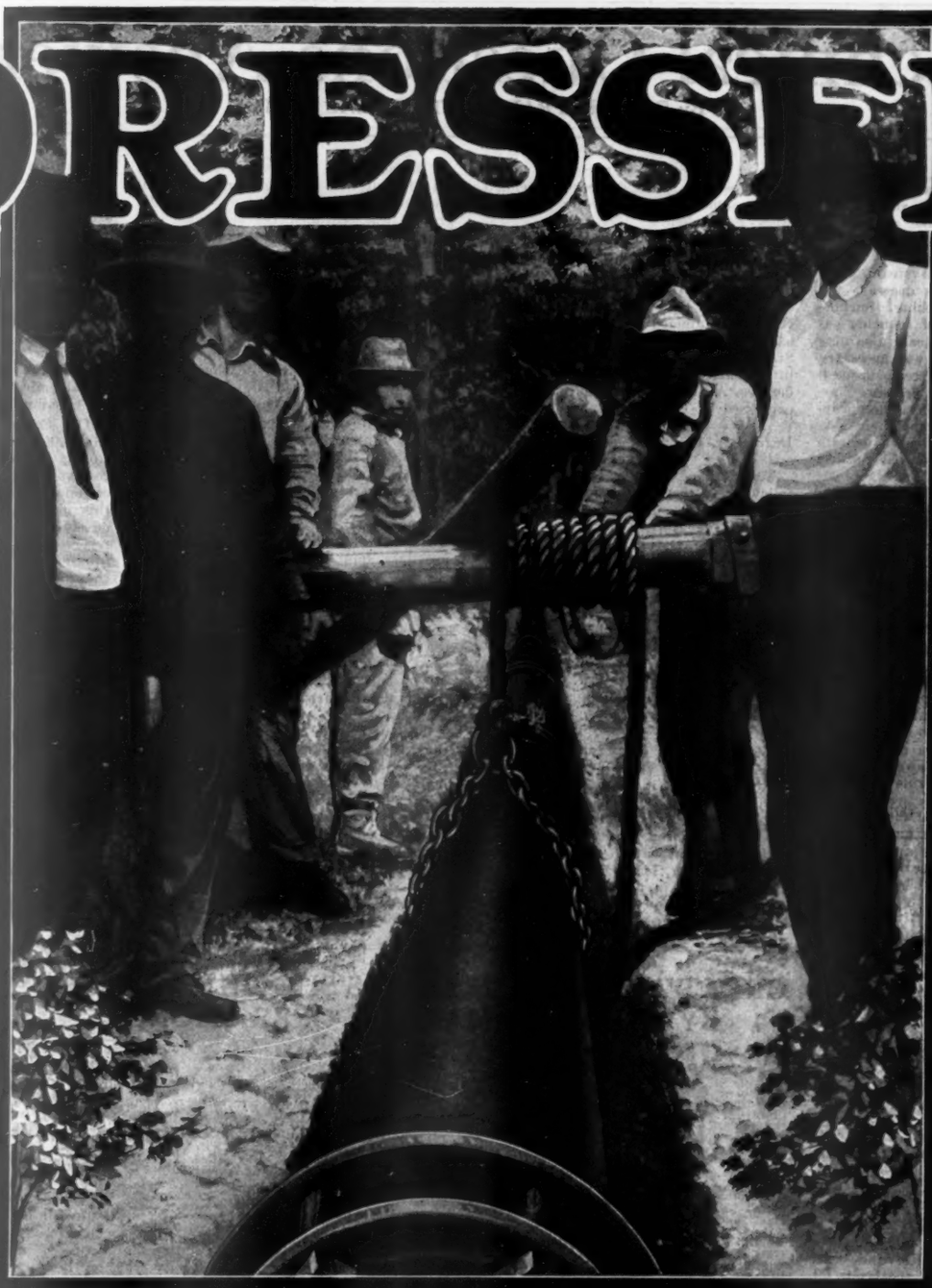

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Technical Questions Answered

By DR. C. K. FRANCIS, TECHNICAL EDITOR

STEAM

Explain the use of steam in a still. Should a large quantity or a small quantity be used? Does it make any difference whether steam is introduced at the bottom or surface of the oil?—B. H.

The chief use of bottom steam is to cause circulation and thus decrease the danger of burning or cracking. Surface steam is for the purpose of reducing vapor pressure and bottom steam also acts in the same way so it is not necessary to have both when bottom steam is used.

The reduction of vapor pressure hastens evaporation. All liquids, under proper conditions discharge from their surface particles of the liquid at a definite rate. The rate depends upon the nature, composition, of the liquid and the temperature. Many liquids if exposed in an open vessel, will entirely evaporate in time, regardless of the temperature. When a liquid is confined, at a fixed temperature vaporization and condensation will proceed until the quantity vaporized corresponds to that condensed; then there will be no further evaporation unless some of the particles, or part of the vapor, is removed. A measure of the pressure at this point, equilibrium, is a statement of the vapor pressure.

The higher the temperature when heating oils, the larger the quantity of vapor produced. Therefore, to speed up the rate of distilling it will be necessary to use more steam than at lower temperatures. There is no fixed rule to follow because the vapor pressure varies with the character of the oil and the temperature. Of course, excessive quantities of steam mean needless waste and once the proper quantity to suit local conditions has been determined suitable rules may be formulated.

GASOLINE OFF COLOR

We have unloaded a car of gasoline through a pipe which was used for fuel oil and same discolored the gasoline. Do you know of any way to bleach this gasoline to bring it back to water white color?—I. A. S.

It is doubtful if gasoline which has been discolored through contact with fuel oil may be restored to a water white color without re-running. A very slight off-color gasoline may be purified if filtered through fullers earth. You may find it economical to return the gasoline to the refinery for re-running. If you do this there will be the processing charge in addition to the loading and freight charges.

You are aware of the fact that the color is caused by asphaltic and other dark colored substances in the crude oil, which of course, concentrated in the fuel oil. Absolute removal of these substances requires distillation, acid treatment, sweetening, and frequently filtering.

A. P. I. GRAVITY

What is the relation between Baume and A. P. I. degrees for determining the gravity of crude oil? Which is the standard hydrometer?—S. T. R.

The instrument, standard in the United States, for determining the gravity of petroleum and its liquid products, is the hydrometer based on the A. P. I. (American Petroleum Institute) scale. The Baume scale for liquids lighter than water, does not have the same relation to specific gravity as the A. P. I. scale. The A. P. I. instrument is used exclusively in the petroleum industry, while the Baume hydrometer is used in many industries, both for light and heavy liquids. Its common use is for determining the density of liquids heavier than water, such as alkaline, salt and acid solutions. The relation of these hydrometers is usually expressed in terms of the modulus for converting to specific gravity. Specific gravity is an indication of the ratio of the weight of a certain volume of a substance at 60 degrees Fahrenheit. to the same volume of water at 60 degrees Fahrenheit.

The origin of the A. P. I. scale is the result of a recommendation made by a committee representing the oil industry through the American Petroleum Institute, to the Bureau of Standards. The National Standard Petroleum Oil Tables have been arranged by the Bureau of Standards and published under this title in Circular No. 154. The relation of degrees A. P. I. to specific gravity is expressed by the formula:

$$\text{Degrees A. P. I.} = \frac{141.5}{\text{Sp. gr. } 60°/60° \text{ F.}} - 131.5$$

The Baume formula is shown in the following history of the subject which is quoted from Circular No. 154.

When the Bureau of Standards first took up the testing of hydrometers in 1904, careful inquiry was made of the manufacturers and users of these instruments as to the basis of the various scales in common use.

In the case of hydrometers for petroleum oils the scale said to be in general use was the so-called Baume scale for liquids lighter than water. The relation of this scale to specific gravity is expressed by the formula:

$$\text{Degrees Baume} = \frac{140}{\text{sp. gr. } 60°/60° \text{ F.}} - 130$$

Subsequently, it was learned that a great number of the hydrometers used in the oil trade were not on the basis of the above relation, but were more nearly in agreement with a scale represented by substituting 141.5 and 131.5 in the above formula in place of 140 and 130. Accordingly, new tables were published by a manufacturer of hydrometers and by oil companies on this basis; that is, the actual hydrometer scales were continued unchanged and the relation to specific gravity was redefined, the new scale still being commonly known as the Baume scale. At the same time other manufacturers and users of oil hydrometers continued the use of the original Baume scale. As a result much confusion existed in the petroleum-oil industry by reason of the use of two so-called Baume scales for light liquids, one based on the modulus 140 and the other on the modulus 141.5.

The American Petroleum Institute, the United States Bureau of Mines, and the United States Bureau of Standards in December, 1921, agreed to recommend that in the future only the scale based on the modulus 141.5 be used in the petroleum-oil industry, and that it be known as the A. P. I. scale, to clearly distinguish it from the original Baume scale for light liquids.

CONCRETE TANKS

What are the advantages of concrete over steel storage? The recent California fires show that they offer no protection from lightning. What causes the oil to boil over? Is it not possible to pump the oil from a burning tank?—W. N.

The principal advantage of concrete tanks over steel tanks is the initial cost. Steel tanks can be erected for approximately 50 cents a barrel, as compared with approximately 25 cents per barrel for reservoir construction. These quotations, of course, vary somewhat depending upon the location, construction costs and size of the various containers. Gas-tight steel tanks have, within the past few years, come into general use for obvious reasons and, while they reduce evaporation losses to a minimum, it must not be taken for granted that properly constructed concrete reservoirs permit excessive loss. A check made some time ago covering reservoirs of several companies showed that there was only an average loss of 25 bbls. a day for each reservoir holding crude and fuel oil. The crude oil reservoir of course showed the largest evaporation. This was around 35 bbls. daily. Where conservation plants have been installed the loss is considerably less, as the vacuum feeds from each container lead to absorption plants where the gasoline content is recovered.

The California fires, consuming over 8,000,000 bbls., indicate the fallacy of storing crude oil in earthen or concrete reservoirs and, while it is possibly more economical to store crude or fuel oil in this manner, the fire hazard more than offsets the advantage. These 750,000-bbl. reservoirs with gas-tight roofs were approximately 18 feet below the surface of the ground and 12 feet above, giving them a height of around 30 feet. No doubt the steel used in the concrete served to attract the lightning. Grounding or some form of electrical connection through a net work of wires or a number of strands of wire have been suggested. A foam installation would have been effective in the California fires.

The boil over is usually due to the presence of water and if the crude were kept free from water this danger would be reduced.

The San Luis Obispo tank farm was hit first and, although only one reservoir was struck, the fire soon spread to the second and the resulting boil-overs engulfed the entire six reservoirs and most of the steel storage at this point. Every effort was made to salvage some of the contents but the gates from the reservoirs were closed and the intense heat and extreme hazard prevented the employes from getting close enough to open the manifolds. In addition to six reservoirs, the company lost fifteen 55,000-bbl. tanks.

The first Brea reservoir boiled over just exactly 8 hours after becoming ignited and this prevented completion of the entire program outlined, which consisted in damning up the low parts of the farm into which the oil later ran. Ditchers and steam shovels were practically useless in handling the wet earth, due to the recent heavy precipitation. More than five inches of rain had fallen just previous to the conflagration and this resulted in a severe handicap, as trucks and machines became mired in the mud and required the assistance of tractors. Out of the three reservoirs which burned at Brea, about 25,000 bbls. of oil were recovered by pumping into another tank.

In practically every case pump station and pipe line capacity precluded the possibility of removing any considerable quantity of oil from these large reservoirs. The quantity of oil is so great that it becomes a physical impossibility to make more than a very small impression on the volume.

LUBRICATING OIL—WAX AND MOISTURE

We have some lubricating oil which is cloudy. When heated it clears up but does not remain clear after cooling. Is this due to water and how may it be removed?—C.F.F.

A cloudy conditions such as here described is probably due to wax. Water may cause a lubricating oil to be dull or cloudy but moisture may usually be removed by settling while hot. Wax cannot be removed by heating. Fresh charcoal or dry fullers earth added to the oil will remove small quantities of moisture. Proper inspection when the oil was refined should have detected this condition.

GREAT ACTIVITY IN FIELDS SHOWN BY APRIL SUMMARY OF OPERATIONS

SUMMARY OF ALL FIELDS

Field—	Comp.	Prod.	Dry	Gas
Eastern	321	1,681	45	61
Lima	39	485	1	1
Indiana	6	46	3	0
Central Ohio	32	181	6	18
Kentucky	92	939	33	2
Tennessee	8	335	1	0
Illinois	27	281	12	0
Kansas	201	20,330	62	12
Oklahoma	467	105,707	132	45
North Texas	387	33,287	139	12
East Central Texas	9	50	3	0
Arkansas	141	17,092	27	6
North Louisiana	103	10,621	17	10
Gulf Coast	87	48,310	26	0
Southwest Texas	34	3,518	11	14
Wyoming	37	12,229	5	4
Montana	30	4,604	6	3
Colorado	10	0	10	0
New Mexico	27	1,395	9	0
Total April	2,053	261,591	543	188
Total March	1,992	189,271	600	193
Difference	66	72,320	57	5

Summary of New Work

Field—	Rigs	Drg.	Ttl.
Eastern	136	367	503
Lima	9	54	63
Indiana	3	35	38
Central Ohio	29	47	76
Kentucky	14	164	178
Tennessee	0	12	12
Mississippi	3	8	11
Alabama	0	5	5
Georgia	1	3	4
Illinois	9	41	50
Kansas	103	356	459
Oklahoma	299	1,102	1,401
North Texas	168	859	1,027
East Central Texas	3	31	34
Arkansas	36	128	164
Louisiana	58	127	185
Gulf Coast	66	176	242
Southwest Texas	31	92	123
Wyoming	32	278	310
Montana	15	129	144
Colorado	19	103	122
Utah	3	31	34
New Mexico	15	137	152
Total April 30	1,052	4,285	5,337
Total March 31	790	3,616	4,406
Difference	262	669	931

Completions, initial production and new work in the oil fields east of California all showed an increase during April as compared to the figures for March. The gain was especially marked in the matter of new operations in the oil fields, there being 262 more rigs and 669 more wells drilling in April than in March, a total increase in field operations of 931.

OKLAHOMA FIELDS

Summary of Wells Completed

County—	Comp.	Prod.	Dry	Gas
Osage	69	5,103	17	4
Tulsa	25	631	11	3
Okmulgee	53	2,319	19	9
Seminole	12	2,670	3	1
Okfuskee	17	1,137	6	2
Hughes	9	12,326	4	0
Muskogee and Wagoner	21	239	8	5
Creek	64	9,150	14	3
Pawnee	25	742	7	0
Kay	14	1,163	4	1
Payne	10	5,056	0	2
Lincoln	22	4,105	2	0
Garfield	22	56,267	4	0
Stephens and Cotton	14	295	7	0
Grady	18	460	3	11
Carter	26	2,793	0	3
Miscellaneous	46	1,252	23	1
Total April	467	105,707	132	45
Total March	439	60,679	141	56
Difference	28	45,028	9	11

Summary of Rigs and Wells Drilling

County—	Rigs	Drg.	Ttl.
Osage	27	93	120
Tulsa	4	28	32
Okmulgee	21	67	88
Seminole	18	95	113
Okfuskee	12	55	67
Hughes	10	46	56
Muskogee and Wagoner	8	16	24
Creek	50	104	154
Pawnee	15	40	55
Kay	18	77	95
Payne	6	69	75
Lincoln	11	51	62
Noble	9	22	22
Garfield	29	94	123
Grant	2	15	17
Grady	12	21	33
Comanche	5	17	22
Stephens and Cotton	9	48	57
Jefferson	8	12	20
Pontotoc and Garvin	2	21	23

(Continued on Page 195)

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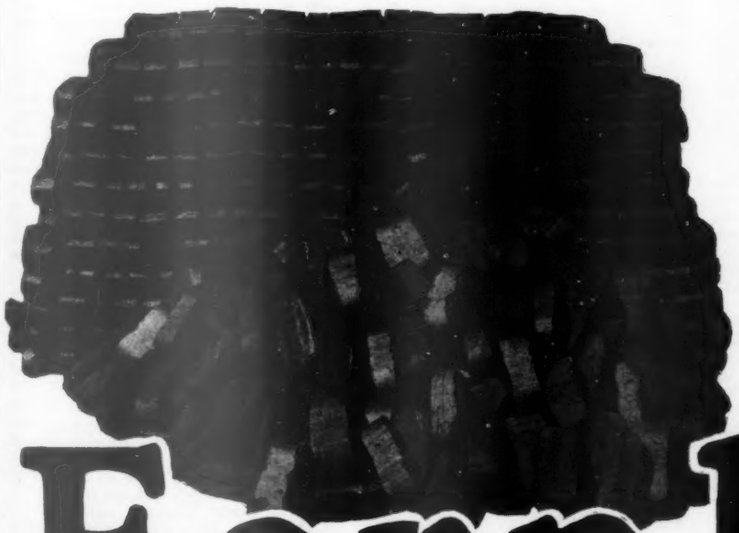

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Widespread Drilling Campaign Is On

Operations of Week Marked By Progress of Development In All Fields Rather Than Specially Notable Completions

Widespread drilling rather than any notable completions featured the week's operations in the different fields. In Oklahoma the Wewoka deep sand may show a northeast trend, judging from the Producers & Refiners' No. 1 Walker, which tapped the Wilcox sand at 4,187 feet and drilled in 9 feet, starting with 174 bbls. which has since decreased to 110. This well is a quarter mile east of the dry hole of the Magnolia company and a quarter mile west of the Dixie company well. Wewoka production reached 27,000 bbls. daily. The discovery of a Wilcox sand in the Braman Townsite Pool attracted much interest. California reported a general increase in drilling. In Texas Panhandle production reached 15,164 bbls., the Gulf company's No. 1 Dial was one of the largest flowing wells in the field. In the Louisiana-Arkansas Field gains in output at Urania and Lisbon and a possible extension of the Smackover light field were noted. A wildcat drilling campaign is reported planned to test the country between the Big Lake Field, Reagan County, Texas, and the Maljamar well in Lea County, New Mexico.

Oklahoma

The Wewoka Field continues the center of interest in the Oklahoma Field. Production in the deep sand is about 27,000 bbls. daily. The Magnolia Petroleum Co. completed No. 5 Harjo, between the Independent Oil & Gas Co.-Atlantic Oil Producing Co.'s well and the main body of production, with an initial production of 1,800 bbls.

The discovery of a producing Wilcox sand well in the Braman townsite pool is likely to be followed by a speedy drilling campaign. It was the Comar Oil Co.'s No. 3 Bechtel which was making 270 bbls. daily flowing by heads last week and is flowing 50 bbls. an hour.

More attention is being given to the more shallow sands in the Garber Field in Garfield County now that the deep sand has been outlined. Roxana Petroleum Corp.'s No. 3-L Schroeder in the Tonkawa sand made 2,428 bbls. in the first 10 hours.

Salt water in the Marland well in Grant County, north of Deer Creek, has been disappointing. Several structures have recently been discovered in Grant County which will probably be drilled.

Kansas

Troup and others' No. 1 Troup in Marion County, 9 miles north of the Florence Pool, the closest production, tapped the Bartlesville formation at 2,365 feet, making 10,000,000 feet of gas. It assures an aggressive drilling campaign between the Florence Pool and the new well. In Butler County Allison & Fitzwilliams swabbed 200 bbls. from No. 1 Blankenship, 3 miles south of Leon.

East Central Texas

The Transcontinental Oil Co. set 4½-inch pipe with packer in No. 1 Ross, Varela survey, west of the Mexia Field, and began bailing but the salt water, believed to be coming through the 6¼-inch casing, was not exhausted. The test caused a flurry in fractional royalty deals, the estimate running as high as $800,000.

New Mexico

An extensive wildcat drilling campaign between the Big Lake Field in Reagan County, Texas, and the Maljamar Oil Co.'s wildcat in Lea County, New Mexico, is promised within 90 days. A new pay picked up in the Maljamar well at 3,603 feet, caused much active trading. A test of the crude showed it to run close to 36 gravity with a 35 per cent gasoline recovery. The Navajo Co.'s No. 1, Section 28-18-28, estimated good for 25 bbls., may extend production 2 miles north.

Ohio

Lantz, Schults & Co.'s second well, 5 miles south of Toledo, started flowing 30 feet in the sand and put 200 bbls. in tankage flowing by heads. It looks good for 100 bbls. and opens a new area for development near Latcha.

North Louisiana-Arkansas

Extension of the Smackover light oil field nearly 2 miles, extension of the Lisbon area, increase in production of the Urania and Lisbon pools and wildcat tests enlivened the report from the north Louisiana-Arkansas fields. H. L. Hunt's No. 1 Swilley, 2 miles south of production in the Smackover light area, is standing full of oil. Some thought the test would flow after the 2-inch tubing had been run.

Lisbon Pool added 3,000 bbls. to its output, besides extending production a half-mile south. Urania's production is likely to go over 13,000 bbls.

California

Development work has materially increased in every section of California. Although there is a tendency to restrict further drilling at Long Beach because of the severe drop in production of wells in the northwest extension due to water conditions, limited amount of sand and uneconomical spacing, additional work at Huntington Beach may offset this decline.

The San Joaquin districts are making a better showing which is also true of Fullerton, Richfield, Coyote, Montebello and Whittier Fields in the south where drilling has been at a standstill for several years.

It is doubtful if State production will fall below 600,000 bbls. for some time, and indeed, may increase as an outcome of townlot drilling at Huntington Beach and the deeper campaign at Inglewood. Two new wells of the Shell Co. at Ventura Avenue Field had a larger output than the aggregate initial daily production of all other wells completed in the State in the same period.

Gulf Coast

Drilling in the light crude fields may be stimulated as result of demand for gasoline oil in the Gulf Coast.

Luling is described as one of the most consistent producing areas in Texas. The total production is now beyond all estimates and holding up well.

Oxford Oil Co.'s No. 3 Floyd, in the Boling Pool, of Wharton County, came in making 3,500 bbls. through a ⅜-inch choker.

More than 175 wells are drilling in the defined pools of the Gulf Coast and in outside territory that is semiwildcat where there are hopes of finding something that other have passed up.

North Texas

Panhandle production has reached 15,164 bbls. Gulf Co.'s No. 1 Dial flowed 1,600 bbls., one of the largest flowing wells reported in the field, and is making 1,550 bbls. The White Eagle Co.'s No. 1 Johnson is swabbing 800 bbls. Howard Petroleum Co. completed a 100-bbl. well in northwestern Young County. Two good producers were completed in Archer County and a failure in the Dibrell Pool. The Roeser-Pendleton-Marland Pool in Shackelford County is holding attention.

Pennsylvania-West Virginia

The eastern fields show more completions but less new production. Considerable new work is being started.

Empire Gas & Fuel Co. had two good completions in Holmes County, Ohio, one for 135 bbls. and one for 110 bbls.

In the Big Injun sand development in Henry district, Clay County, West Virginia, there are 25 rigs up and wells drilling and production is close to 1,000 bbls. a day.

The prospects are more promising in the salt sand pool in Scott district, Putnam County, West Virginia, with 100 bbls. within the past 30 days from this shallow pool.

Central West

The best completion for the week in the old Lima Field was Charles Geseichen's well in Bath Township, Allen County, with a flush of 40 bbls.

In the Friendsville Pool, Wabash County, Illinois, Jos S. Young, Jr. and others' well was estimated at 80 bbls. flush at first. It put 105 bbls. in tankage in the first 8 hours' pumping. Clark Oldendorf and others' offset to the Bass farm discovery well is estimated as good, 200 bbls. flush.

Rain delayed operations in the Saginaw, Michigan, field.

Kentucky-Tennessee

There are 178 rigs on locations in the Kentucky Field, the western section leading with six rigs and 107 drilling wells. Barren County is the most active in the State with 29 drilling wells and rigs, followed closely by the Cumberland-Monroe area and the Owensboro district.

Interesting wildcats are under way in the northwestern part of Warren County. The new Hopewell Pool in Cumberland and Adair Counties is the most active in the south central section.

Southwest Texas

Reiter-Foster Corp.'s No. 1 Alexander, south of Dale in Caldwell County, has failed to produce but will be carried 100 feet farther. Other tests are expected.

Mexico

But 2 of the 11 completions in the Mexican fields finished in the pay, both in the Panuco Field. Empire Gas & Fuel Co.'s No. 5-A, Lot 11, in the west Maguabes sector, is rated at 2,000 bbls. at the shallow depth of 1,348 feet.

Rocky Mountain Area

The Moab, Cane Creek, Utah, well is still trying to get a water shut off about 2,000 feet. The Shaffer structure well is down about 600 feet. The Midwest Oil Co. is to start three other tests between these two, one each on the Elk Hills, Cedar Mesa and Lime Ridge structures.

Sunburst Field, Montana, reports eight new producers. The Tri-State Oil Co. had one of 800 bbls. and one of 200 bbls.

Canada

Edmonton-Wainwright Oils, Ltd.'s offset to British Petroleum's No. 3-B, in the Irma-Wainwright Field, is estimated at 150 bbls. daily from the same horizon.

There is a marked increase in drilling activity in the Canadian western fields, particularly west of Calgary.

Late News From the Fields

OKLAHOMA

In the South Braman Pool, the Comar Oil Co.'s No. 3 Bechtel, NW cor. SW SE SE, Section 5-28-1w, was drilled 3 feet deeper into the Wilcox sand and the flow was increased to 80 bbls. an hour.

Interest in the Wewoka deep sand area was again stimulated by the drilling in of the Producers & Refiners Corp.'s No. 1 Walker, SW cor. SE, Section 32-8-8, which topped the Wilcox sand at 4,187 feet and drilled 9 feet in. The well started flowing 174 bbls. hourly and gradually decreased to a rate of 110 bbl. an hour. This well is regarded as very significant to the future of the pool. It is only a quarter of a mile east of the dry hole drilled by the Magnolia Petroleum Co. and is a quarter of a mile west of the well completed by the Dixie Oil Co. It may reveal a northeast trend for the pool.

West of Okmulgee, Dow, Evans and others' No. 1 Sizemore, SW cor. SW, Section 20-14-11, had sand at 2,469-77 feet and is estimated at 150 bbls.

In Seminole County, The Texas Company's No. 1 Brown, SE cor. NW, Section 10-9-5, had a show of oil and gas at 3,553 feet. The hole is caving badly and a liner will be run. The Prairie Pipe Line Co. is putting a line to the well.

In Kay County, the Mississippi Valley Oil Co.'s No. 1 Balzer, NW cor. NE, Section 3-27-2, which had 5,000,000 feet of gas in sand at 3,403-15 feet and went out of sand at 3,427 feet picked up a formation which may be the Bartlesville sand at 3,477 feet and when the bailer was run it was found to be half full of oil.

OHIO'S PLANS IN MEXICO

SAN ANTONIO ,Tex., May 4. — The Ohio-Mexico Oil Corp. has been formed for the purpose of drilling the 4,000,000-acre block of leases in Old Mexico opposite Eagle Pass and Laredo recently purchased by the Ohio Oil Co. Charles J. Hares, chief geologist for the Ohio Oil Co., is now in Mexico making the location for the first test, which will be on a location about 30 miles south of Cuatro Cienegas.

T. S. Hogan, of Denver, Colo., who obtained the leases from the Cardenas family of Mexico, was in San Antonio en route to Mexico City on business for the new company. He will move his family to San Antonio and make this his headquarters.

The directors of the Ohio-Mexico Oil Corp. are F. E. Hurley, general manager and director of the Ohio Oil Co.; R. J. Berry, president of the Mid-Kansas Oil & Gas Co., and a director of the Ohio Oil Co.; W. W. Fleming, director of the Ohio Oil Co.; F. W. Messimer of the land department of the Ohio Oil Co.; F. M. Cardenas, one of the Cardenas family, owners of the 4,000,000-acre ranch; T. S. Hogan, of Denver, and T. B. Hoffer, of Fort Worth.

The 4,000,000 acres lies inland from the Rio Grande and is scattered in big tracts of around 1,000,000 acres each. The first test is on the San Marcos ranch, which is one ranch out of the larger body of land owned by the Cardenas family and a structure on that tract is said to exist that is some 60 miles long.

OHIO

TOLEDO, Ohio, May 4.—Five miles south of Toledo, in Section 26, Lake Township, Wood County, Lantz Schults & Co.'s second well on the Michales started flowing 30 feet in sand and put 200 bbls. of oil and water in the tanks, flowing by heads. It looks good for 100 bbls. and opens up a new area for development near Latcha.

GULF COAST

Yount-Lee Oil Co.'s No. 3 Gilbert, in the Sour Lake Pool, is flowing 1,300 bbls. of 37 gravity oil at 4,160 feet. Mills Bennett's No. 5 Japhet, at Barber Hill, is making 300 bbls.

The Gulf Production Co. worked over No. 2 Smith at High Island for the fifth time and it responded with a flow of 500 bbls. The depth is 3,200 feet. It is on the south side of the dome and near the Gulf of Mexico. The High Island Pool is in Galveston County, near the juncutre of Chambers and Jefferson Counties.

(Continued on Page 195)

Panhandle Output Reaches 15,164 Bbls

Gulf Co.'s No. 1 Dial Flowed 1,600 Bbls. and Making 1,550 Bbls., One of Largest Flowing Wells Reported in Field

By C. D. Lockwood
Staff Correspondent, North Central Texas

FORT WORTH, Tex., May 3.—One of the largest natural flowing wells in the history of the Panhandle Field featured the week in the north central Texas area adding another body blow to those who have disparaged the future importance of that great region. As a result of this big producer coupled with the shooting of some other wells in Hutchinson County, the Panhandle production rose to new heights during the week, the estimate output of the Amarillo district on Monday being about 15,164 bbls. daily.

Little of a sensational nature was contributed by the other north central Texas district, although Shackelford County continued in the limelight due to the Roeser-Pendleton-Marland Pool and the discovery of some oil in another well about 6 miles away; the completion of two good wells in Archer County maintained interest and drilling there; the Howard Petroleum Co. added another well to its pool in northwestern Young County estimated good for about 100 bbls. like the discovery well which is very good indeed at 556 feet. Wilbarger County provided a flurry of interest when a rumor got abroad that Plost and others had a showing of oil in the northeastern corner of the county, about 7 miles north of the Electra Pool, although this could not be verified; and the Dibrell Pool, about 10 miles northeast of Coleman in that county apparently had a failure when the White Eagle Oil & Refining Co.'s No. 1 Dibrell failed to get enough oil to make a commercial well at 1,908 feet. This well was being shot Monday and if the shot failed to get results the company intended to deepen it. Nothing was reported from the west Texas region but a few teasers which will be chronicled in due order.

The big Panhandle well is the Gulf Production Co.'s No. 6 Dial (or Perkins) in Section 1, Block 1, north of the Canadian River. The initial output was 1,600 bbls. on April 29, and Monday morning's gauge showed it was still holding up remarkably well, the production being 1,550 bbls. May 3. This well was drilled in less than 60 days, the authorization for the test having been made March 2. Sand was found at 2,857-90 feet.

The White Eagle Oil & Refining Co.'s No. 1 Johnson was looking good, having swabbed about 800 bbls. from pay at 2,699-2,717 feet. It will probably be deepened.

Shackelford Pool

In the Shackelford County Pool, Roeser & Pendleton and the Marland Oil Co.'s No. 4 Cook "A", in Section 84, had sand at 1,276-86 feet and was flowing 16 bbls. an hour. Monday's gauge for the three wells owned jointly by the above interests was 550 bbls. for No. A-1-85, and 540 bbls. for the other two, Nos. A-1-84 and A-4-84, or a total of 1,090 bbls. Roeser & Pendleton's No. B-1-85 gauged 1,101 bbls. Monday from total depth of 1,205 feet. A rig was up for their No. B-3-85, and material was being moved in for No. B-2-85, while locations had been staked for Nos. B-8-85 and B-1-84.

A test in this area being watched with considerable interest is the Amerada Petroleum Corp.'s No. 1 Cook, about three-quarters of a mile from production. It was drilling at 1,260 feet.

The Humble Oil & Refining Co. has three tests under way in this pool, No. 2 Cook drilling at 550 feet, No. 3 Cook shut down at 360 feet, and No. 5 Cook rigging up.

On the Roeser & Pendleton and Marland Oil Co. property, seven wells are drilling, one is rigging up, one has rig completed and one location has been staked. No. A-4-85 was pulling the 6-inch at 1,223 feet, and No. A-1-81 was drilling at 1,345 feet.

The well located about 6 miles from this pool is Overlee and others' No. 1 L. H. Hill, in Section 584, T. E. & L. Survey. Sand was topped at 911 feet and was drilled 2 feet. There was about 400 feet of oil in the hole but the 8-inch had to be underreamed about 100 feet before a test could be made and the value of the strike determined.

Good Archer County Wells

One of the two good Archer County wells was the Shasta Oil Co. and others' No. 1 Meade estate, which found sand at 1,437-51 feet and bailed 15 bbls. an hour for the first 24 hours after which it was being rigged up to pump. The other was Howell & Barkley's No. 1 W. R. Brown, about half way between the Sunshine State and Oil Investment pools. It swabbed 75 bbls. in the first 15 hours from sand at 1,295-97 feet. Two feet of dry sand was found on top of the oil sand. L. T. Burns' No. 3 Jackson had an oil sand at 1,555-72 feet which filled the hole up 500 feet in 12 hours. The well pumped 40 bbls. in the first 10 hours. Rowling & Cochran were rigging up a rotary for their No. 1 A. C. O'Donnell.

Hurdle District, Upton County

In the Hurdle district of Upton County, the Marland Oil Co.'s No. 1 Benton Land Office Co. filled up 1,500 feet with oil at 2,345 feet and at a total depth of 2,353 feet swabbed 75 bbls. in 2 hours on May 1, and was then shut down for 16 hours. The following day it swabbed 65 bbls. in 4½ hours. The same company's No. 3 Burleson swabbed 190 bbls. Saturday and 117 bbls. Monday. It was cleaning out 8 feet off bottom which was 2,140 feet. Marland's No. 2 Burleson was running shot at 2,220 feet Monday. The same company's No. 2 Sanger swabbed 45 bbls. at total depth of 2,245 feet and was cleaning out. F. P. Zoch and Marland's No. 1 Talley was drilling at 2,820 feet in lime, and No. 1 Union Land Co. was drilling at 2,535 feet. No. 1 Rhurman of the same interests was drilling at 3,455 feet.

Crane County

In Crane County, the Marland Oil Co.'s No. 1-A Hughes was bailing two bailers of sulphur water an hour from gray lime at 2,280 feet. The Magnolia Petroleum Co.'s (Church & Fields) well pumped 55 bbls. of oil with no water last Friday and 50 bbls. of oil, also free of water Saturday.

Crockett County

In Crockett County, F. P. Zoch and the Marland Oil Co. staked a location for No. 1 University in Section 34, Block 29. The Humble Oil & Refining Co. and Marland's production on the Powell property was 360 bbls. Monday. Their No. 4 was underreaming at 2,450 feet; No. 5 was spudding at 20 feet; No. 6 was drilling at 1,440 feet in salt; and No. 7 was drilling at 1,080 feet. F. P. Zoch's No. 1 Talley was drilling in lime at 2,790 feet with a slight showing of oil. The Marland Oil Co.'s No. 1 Todd was drilling at 1,305 feet after getting a gas show at 1,235-45 feet.

Cromwell's No. 2 Powell had pay sand at 2,668-92 feet and was put on the pump April 30. It made 210 bbls. in the first 13 hours and was shut down.

Reagan County

In the Big Lake Field, Reagan County, the Big Lake Oil Co.'s No. 66 University was drilling in sand at 3,051 feet and making 65 bbls. Saturday. No. 63, which produced a maximum of 1,242 bbls. on April 21, was down to 332 bbls. May 1 and will probably be deepened a little.

James A. Mascho and the Marland Oil Co.'s No. 1 Sawyer Cattle Co., in Reagan County, was down 480 feet.

Texas Panhandle Operations

An important test being watched closely in Carson County is the Marland Oil Co.'s No. 1-B Burnett Ranch. It was shut down at 3,025 feet Monday waiting for cement to set.

The Amarillo Oil Co.'s No. 3 Bivins "B" was spraying 75 bbls. from granite wash at 3,072-3,100 feet. The Amatex Development Co.'s No. 1 E. S. Polling was spudded. The American Refining Co.'s No. 6 Burnett was drilling at 2,760 feet, and No. 7 was spudding. B. S. Barnes' No. 1 was shut down at 1,150 feet. J. S. Cosden's No. 1, was a 50,000,000-foot gasser at 2,240-2,600 feet, total depth being 2,820 feet. The Gates Oil Corp.'s No. 2, was shut down at 2,957 feet with bailer in the hole. The Magnolia Petroleum Co. was drilling at 2,100 feet in No. 2, and had a rig on the ground for No. 3. The Marland Oil Co. had rigs on the ground for Nos. 2, 3 and 4 Burnett "A"; had a small show of oil at 2,935 feet, total depth 3,025 feet, in No. 1 Burnett "B"; and was drilling at 2,130 feet in No. 5 Burnett "B."

McFarland & Thomas were fishing for bit in No. 1 G. W. Witter, at 360 feet. The Texas Company spudded No. 8 S. B. Burnett and was fighting cave at 2,879 feet in No. 4 M. C. Burnett. Young & Patrick were drilling red shale at 1,835 feet in No. 1 J. C. McConnell.

Gray County

The Texas Company's No. 1 Brown found pay lime at 3,098-3,255 feet and had 2,000 feet of oil in the hole with no gas. It was shot with 530 quarts and bridged. Clark & Baldridge's No. 1 Merten Brothers was rigging up standard tools at 2,442 feet. Jack Greenwood and others had a location for No. 1 H. B. Lovett. The Texas Company's No. 2 G. H. Saunders was fighting cave at 2,505 feet after getting 30,000,000 feet of gas at 2,370-2,400 feet. The Wilcox-Pampa Oil Co.'s No. 2 Combs & Worley had 1,000,000 feet of gas at 2,885 feet and was drilling at 2,955 feet. No. 3 Worley & Reynolds was drilling at 2,525 feet, and a rig was up for No. 4.

Wheeler County

The Gibson Oil Co. had a rig up for No. 2 H. C. Phillips, and was spudding No. 3 at 100 feet. McFarland & Thomas' No. 1 Kachelhoffer was drilling granite at 2,389 feet. The Midwest Exploration Co. had a third of a bailer of oil in its No. 2 G. W. Porter at total depth of 2,303 feet, and was spudding No. 1 J. M. Shelton at 80 feet. Hal H. Vaughn was fighting cave in his No. 1 O'Gorman.

Wichita County

The Ascot Oil Co.'s No. 1 J. E. Roller was drilling at 1,700 feet after getting salt water in sand at 1,565-75 feet. Dr. E. B. Bailey's No. 1 H. Wills was feeling for sand at 1,275 feet, and his No. 2 was setting 6-inch to test sand at 580-85 feet. The Humble Oil & Refining Co.'s No. 1 Saunders was drilling at 1,786 feet in lime.

Kemp, Bean & Jackson had a rotary rig up for No. 1 fee, and H. M. Long was drilling at 1,810 feet in No. 1 Miller estate. The Magnolia Petroleum Co.'s No. 127 Reilly was drilling at 1,550 feet; No. 128 had oil sand at 1,538-40 feet good for 10 bbls. and was lowering the 6-inch. The Texhoma Oil & Refining Co. and Magnolia Petroleum Co.'s No. 1-A H. Beach was preparing to start up after being shut down in black lime at 3,000 feet. Tenbrink & Rowe had a rotary derrick for No. 1 J. L. Bryan. F. Beaudoin was drilling No. 1-A Snow at 1,700 feet. Boller & Wolfe were drilling No. 2 Daume at 1,750 feet. Brader and others' No. 3 Jennings was estimated good for 20 bbls. at 1,558-93 and 1,604-09 feet on the pump. Bridwell, Heydrick & Moore's No. 3 Waggoner Brothers was dry and abandoned at 1,562 feet. Chenault & Burleson were drilling No. 1 Powell at 1,000 feet. The Dale Oil Corp.'s No. 22 Jennings was shut down at 1,620 feet after drilling dry sands 1,593-1,604 and 1,616-20 feet. G. H. Howell and others' No. 1 Douglas was shut down at 1,869 feet. It had dry lime at 1,862-69 feet. The Humble Oil & Refining Co.'s No. 4 Waggoner "D" was completed for 6 bbls. at 586-93 feet, and No. 4 Mitchell-Waggoner was drilling at 600 feet with a small show at 594-600 feet.

Larkin & Wilson abandoned No. 1 Waggoner Brothers at 830 feet. The Magnolia Petroleum Co.'s No. 1-B Ramming was drilling at 700 feet, and No. 20 Ramming "A" was rigging up to deepen at 1,310 feet. Pace and others' No. 1 Mitchell pumped 20 bbls. the first 20 hours from oil sand at 1,501-10 feet and 5 bbls. the second 20 hours. It was cleaning out. Parsons & Rankin's No. 1 Payton was dry and abandoned at 2,116 feet. Perkins & Cullum had a location for No. 1 Hoover, and were drilling at 1,210 feet in No. 2 Long. No. 1 Burnett was dry at 1,950 feet. It had dry sand at 1,694-96 feet.

The Ryan Petroleum Co. had a location for No. 64 Nance and the Shappell Oil Co. had a rig up for No. 8 McCarty. Staley & Wynne were drilling No. 1 Priddy and others at 700 feet. The Tidal Oil Co.'s No. 1 Waggoner Brothers missed the 1,500-foot sand and was drilling at 1,672 feet.

Wilbarger County

F. A. Beatty was rigging up standard tools for No. 2 Waggoner. Bob Brewer was drilling No. 1 Waggoner at 790 feet. Bridwell & Heydrick were fishing tools and drill pipe in No. 13 Stephens at 2,100 feet. The same interests and others were drilling at 639 feet in No. 1 Waggoner.

The Milham Corp.'s No. 3 Waggoner "B" was shut down for a shot after getting a good show in sandy lime at 2,536-50½ feet; No. 1 Waggoner "D" was cleaning out at 2,455 feet; No. 2 Waggoner "H" was temporarily abandoned at 2,483 feet; Nos. 3 and 4 Waggoner "H" were locations; No. 5 Waggoner "H" was completed for 35 bbls. on the pump from lime at 2,539-46 feet; No. 7 pumped 155 bbls. from lime at 2,309-13 feet; No. 1 Waggoner "J" had collapsed 12-inch pipe at 1,380 feet; No. 6 Waggoner "L" swabbed and flowed 455 bbls. the first 24 hours and 404 bbls. the second day from oil sand at 1,884-98 feet; No. 14 Waggoner "L" was spudding.

Foard County

The Central Oil Ints.' No. 1 Burress was drilling at 970 feet. The Humble Navarro Oil Co.'s No. 1 Easley was drilling at 3,250 feet.

Baylor County

W. J. Green was drilling No. 1 Cockrell at 1,360 feet. T. L. Head and others were drilling No. 1 Stevens at 1,350 feet. The Magnolia Petroleum Co.'s No. 6 Portwood was drilling at 900 feet. The Pandem Oil Corp.'s No. 1 Sykora was dry and abandoned at 1,470 feet but its No. 1 Young "C" pumped 20 bbls. of

(Continued on Page 198)

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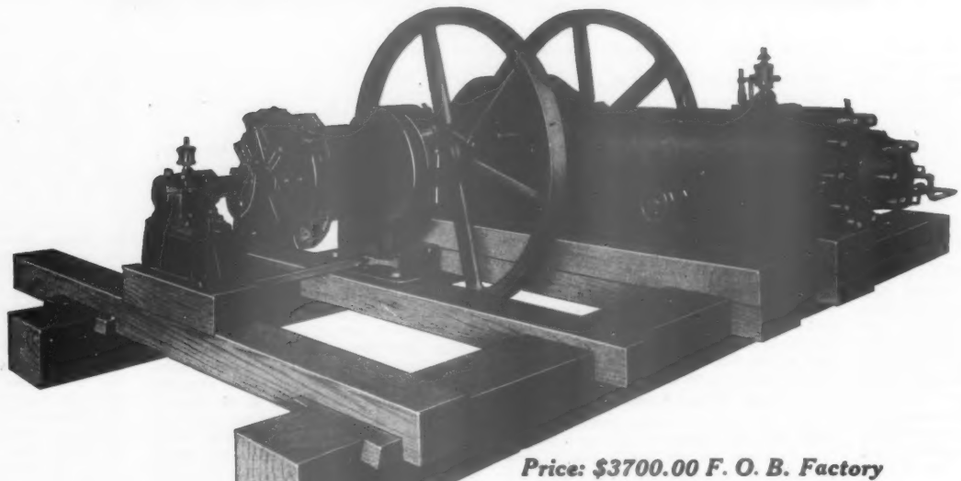

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Wewoka Center of Oklahoma Interest

Production of Deep Sand There About 27,000 Bbls. Daily. Wilcox Sand Producer Completed on Braman Townsite

By J. L. Dwyer
Staff Correspondent, Oklahoma Fields

The Wewoka Field, on the border between Hughes and Seminole Counties, is the most conspicuous spot in Oklahoma oil fields today. This field, which had its discovery and initial boom three years ago, has been revivified by the discovery of a deeper sand and, owing to disagreements among the operating companies in this field, there are several leases which will have deep sand wells located one to each five acres.

The deep sand was discovered by the Magnolia Petroleum Co. last December, and today finds 10 wells producing a daily average of almost 27,000 bbls.

The daily production of the Wewoka deep sand for the 24 hours ending Monday morning, May 3, at 7 a. m., was as follows:

Magnolia Petroleum Co.:	Bbls. Oil
No. 1 Harjo	3,785
No. 2 Harjo	5,436
Nos. 3 and 5 Harjo	3,251
No. 3 Franz	2,113
W. R. Ramsey's No. 4 Amos	2,888
Homaokla Oil Co.'s No. 2 Carolina	6,505
Amerada Petroleum Corp.'s Nos. 1 and 3 Harjo	1,691
Dixie Oil Co.'s No. 1 Garner	1,247
Independent Oil & Gas Co. and Atlantic Oil Prod. Co.'s No. 1 Simon	
Total	26,899

Magnolia Gets Good Well

During the past week the Magnolia Petroleum Co. completed No. 5 Harjo, which is located between the Independent Oil & Gas Co.-Atlantic Oil Producing Co.'s well and the main body of production. This well, CWL SW NW, Section 5-7-8, found the pay sand at 4,167-93 feet and had an initial production of 1,800 bbls. Previous to its completion, the discovery well, Magnolia Petroleum Co.'s No. 1 Harjo, had stopped flowing and is being rigged up to pump. The daily production of No. 2 Harjo is also decreasing and the completion of the south wells have bolstered the production. In the opinion of many who have made a close study of the region, the pool may spread to the northeast, but they believe it is very unlikely that it will extend much farther south than the Independent-Atlantic well. In an effort to prove up the east side of the section, the Independent Oil & Gas Co.-Sinclair Oil & Gas Co. will drill a well in the NW cor. SE, Section 5-7-8. This location is a half mile east of the Magnolia Petroleum Co.'s No. 5 Harjo.

Several who have made an intensive study of the Wewoka territory for some years believe that the area of the deep sand production will not extend over 400 acres.

Wilcox Sand Well at Braman

The discovery of a producing Wilcox sand well in the Braman Townsite Pool was the next important development this week, and the Comar Oil Co.'s No. 3 Bechtel, NW cor. SW SE SE, Section 5-28-1w, carries the honors of first production in this horizon. The Bechtel well had a limey formation at 3,458 feet and there is some discussion as to where the top of the sand was found. The consensus of opinion gives the sand at 3,461-82 feet and the well is flowing 50 bbls. an hour as this is written. Last week this well was making 270 bbls. daily flowing by heads, and the good pay was penetrated in the last two feet.

The discovery of production in the Wilcox at Braman is important if the area of the pool be even as extensive as the shallow sand, and with the owners (Marland-Roxana) of the new well needing the oil for pipe line requirements, there is little question that a speedy drilling campaign will ensue. The entire area of the Braman Townsite Pool is owned by the Comar company with the exception of one well by the Wentz Oil Corp., and while it is very unlikely that the structure of the lower sand will conform perfectly to the structure of the 2,300-foot Stalnaker sand as outlined by the producing area, there is no question but what the Comar is amply protected, regardless of what direction the pool may spread. Good production in the Wilcox sand at a depth of 3,400 feet should be a remunerative proposition.

Developing Shallow Sands

With the outlines of the deep sand in the Garber Field in Garfield County practically outlined, more attention is being given to the more shallow sands, particularly the Hoovers and the Tonkawa sand. The Roxana Petroleum Corp.'s No. 3-L Schroeder in the Tonkawa sand has a total depth of 3,116 feet and made 2,428 bbls. by flows in the first 10 hours. The top of this sand is not available, and an unusual condition is represented in the fact that there have been six holes drilled on this one location. Three shallow wells, one Wilcox sand well, the new find, and a dry hole. The dry hole reached a depth of 3,216 feet, and this exceptional fact is caused by a junked hole which was abandoned at 3,216 feet when the first Wilcox sand well on this location was drilled. There is ample room for a good-sized pool in the Tonkawa sand in this section. The Roxana's 3-L Schroeder is in SE cor. SW SW, Section 18-22-3w.

In Grant County, north of Deer Creek, the Marland Oil Co.'s No. 1 Webb, NW cor. NE NE, Section 2-27-3w, was ruined by deeper penetration as when it was drilled 2 feet farther the well flowed salt water and no oil. The total depth of the well is now given as 4,357 feet.

The salt water in this well is very disappointing, as its proximity to the Deer Creek Field was considered in its favor. Grant County is slowly becoming more active, and several structures have been discovered recently which will very likely be drilled. Before the Marland well was drilled into water it was flowing 170 bbls. daily and was cutting 3 per cent b.s.

The Ingalls Pool in Payne County averaged 7,923 bbls. daily from seven wells during the past week. This is an increase of 928 bbls. and three wells.

Good Lincoln County Well

The Skelly-Ford area of Lincoln County had an exceptionally good well completed to augment its production when the Mid-Continent Petroleum Corp.'s No. 3 Earp, NW cor. SW NW, Section 8-15-6, found the Wilcox sand at 3,995-4,002 feet and flowed 1,520 bbls. the first day. This is far above the average completions which have been chalked to the credit of this pool, and may revive the interest if it holds up in good manner.

In the Okmulgee district, the Simms Oil Co. has a good well on the property which was recently purchased from C. H. Lebow and others of Tulsa, Okla. The new well is No. 13 Doyle, C NE SW, Section 15-13-14, and it found the Wilcox sand at 2,441 feet and drilled to a total depth of 2,452 feet. It is flowing 350 bbls. daily.

During the past week T. B. Slick of Tulsa purchased from Hargrove, Hudson and W. R. Whiteside, who are executives of the Douglas Oil Co., a group of 1,000 acres of scattered oil and gas leases for a consideration reported at $50,000 cash. These leases are well distributed throughout Seminole, Hughes and Pottawatomie Counties.

For the week ending May 1, the deep sand in the Garber Field had a daily average as follows:

Company—	Wells	Oil	Wtr.
Franchot	1	220	0
Carter	2	117	70
Healdton	2	49	107
Marland-Mid-Continent Pet. Co.	12	668	1,500
Roxana	16	14,203	3,750
Sinclair	35	13,964	22,262
Total	68	29,221	27,689

In Seminole County the well of F. J. Searight and others, No. 1 Davis, SE cor. NE SE, Section 33-10-6, averaged 276 bbls. daily from sand at 4,114-21 feet.

Osage County

Peters Oil Co. and the Plains Petroleum Co.'s No. 4, SW cor. NW NW, Section 17-27-6, is drilling at 500 feet. The Carter Oil Co. has the rig up for No. 17, C NW, Section 16-26-6. Lewis Oil Co. has spudded No. 4, CNL NW NE SE, Section 21-26-6.

In the Fairfax region, the Prairie Oil & Gas Co.'s No. 4, SW cor. SE SE, Section 21-25-6, had sand at 2,681-2,714 feet and made 510 bbls. naturally. It was shot with 5, with 8, and with 10 quarts and made 440 bbls.; No. 5, SW cor. NW SE, Section 21-25-6, had sand at 2,708-41 feet and made 120 bbls. after a shot of 40 quarts; the rig is on the ground for No. 6, NE cor. SW SE, Section 21-25-6, and also for No. 7, SE cor. SE, Section 21-25-6.

J. L. Bird and others' No. 1, NE cor. SE, Section 7-25-8, is dry and abandoned at 2,778 feet. A. G. Oliphant and others' No. 1-A, CSL SE SE, Section 19-25-8, is rigged up. McCune and others have a machine up for No. 7, CSL SE NE, Section 16-24-8. Ernest McCarty's No. 1, SE cor. NE, Section 29-24-8, is dry and abandoned at 2,675 feet. Continental Oil Co. has completed No. 1, SE cor. SE, Section 29-24-8, for 90 bbls. in sand 2,587-94 feet. It was shot with 10 quarts. Continental Oil Co. and others have a failure in No. 1 C SE NW, Section 12-23-8, at 2,610 feet. Continental Oil Co. and the Prairie Oil & Gas Co. have completed No. 2, SW cor. NE SE, Section 5-23-9. Sand was 2,087-2,120 feet and the well is making 350 bbls. naturally. Mid-Continent Petroleum Corp. is drilling at 450 feet in No. 15, C SE SE, Section 18-22-10. Kewanee Oil Co.'s No. 12, CEL NE NE, Section 5-22-11, had sand 1,670-1,716 feet and made 30 bbls. after a shot of 80 quarts. Ray Branstetter and others' No. 1 C W half SW, Section 23-22-11, had sand 1,454-1,515 feet and is good for 20 bbls. after a shot of 80 quarts.

Franchot, Moore and others have a failure in No. 7, CSL SW SW, Section 11-21-9, which is abandoned at 2,310 feet. Mid-Kansas Oil Co. has a rig on the ground for No. 2, CEL NE SE, Section 10-21-10, and No. 6, SW cor. NE NW, Section 11-21-10, is completed for 300 bbls. from sand 2,060-66 feet; the rig is on the ground for No. 7, NW cor. SE NW, Section 11-21-10. Devonian Oil Co. and the Tidal Oil Co. have rigged up a machine for No. 2, CEL SW, Section 27-21-10.

Commercial Drilling Co.'s No. 8, C SE SE, Section 16-21-12, is drilling at 500 feet. Kewanee Oil Co. has rigged up a twin well in No. 9, SW cor. SW, Section 19-21-12. Elliott & Smith's No. 24, NW cor. NW, Section 30-21-12, is rigged up. Grimes & Gillespie are drilling at

BARTLESVILLE SAND WELL 9 MILES FROM FLORENCE POOL IN KANSAS

By J. L. Dwyer
Staff Correspondent, Kansas Fields

In addition to the regular completions of inside wells recorded during the past week, the Kansas fields offered a new well which evoked more than passing interest from the oil fraternity.

It was Troup and others' No. 1 Troup, in Section 8-19-4, Marion County, 3 miles north of the town of Marion and 9 miles north of the Florence Pool, which is the closest production. Coming so far to the north of a Bartlesville pool, the new well could hardly be calculated to extend the production this distance, but its discovery will surely result in an aggressive drilling campaign between the Florence Pool and the new well.

Troup and others' well had a lime shell on top of the Bartlesville sand at 2,360 feet, and tapped the Bartlesville formation at 2,365 feet. The well is making 10,000,000 feet of gas and will be shut in and completed for a gas well.

In Butler County, Allison & Fitzwilliams' No. 1 Blankenship, SE cor. NW, Section 3-28-6, swabbed 200 bbls. from sand at 3,050-54 feet. This well is 3 miles south of Leon.

Cowley County

Brewer & Lewis have a dry hole in No. 1, SW cor. NE, Section 31-30-6, which is abandoned at 2,931 feet.

Harper County

Wakefield and others have a rig on the ground for No. 1 Muir, SE cor. SW SE, Section 28-31-9w.

Chautauqua County

Craft and others' No. 3 McAllister, NE cor. SW NE, Section 28-32-10, is drilling at 1,375 feet.

Elk County

Theta Oil Co. is rigging up No. 1 Walker, NE cor. NE, Section 27-31-10. Denman and others are drilling at 780 feet in No. 1, SW cor. SE SW, Section 36-31-10.

Butler County

Empire Gas & Fuel Co.'s No. 32, NW cor. SE SW, Section 28-25-5, had sand 630-45 feet and made 10 bbls. after a shot of 15 quarts; No. 30 Finney, SE cor. NW NW, Section 29-25-5, is spudded. Same company is drilling at 700 feet in No. 2, SW cor. SE NW, Section 27-26-7. White Eagle Oil Co.'s No. 3, NE cor. SW, Section 27-26-7, had sand 2,135-67 feet and made 100 bbls. naturally. Flack and others' No. 4 Tobler, SE cor. SW SE, Section 22-27-7, is a new rig. Sinclair Oil & Gas Co.'s No. 4, NE cor. SE, Section 22-27-7, is spudded. Amerada Petroleum Corp.'s No. 6, SE cor. NW, Section 27-27-7, is drilling at 350 feet; Empire Gas & Fuel Co.'s No. 2, SW cor. NW NE, Section 27-27-7, had sand 2,738-61 feet and made 225 bbls. after a shot of 110 quarts.

Phillips Petroleum Co. has the rig up for No. 4 Phillips, SE cor. NW NW, Section 27-27-7. Greenland Oil Co.'s No. 4, SE cor. NE SE, Section 28-27-7, had sand 2,715-52 feet and was shot with 140 quarts and made 150 bbls.; No. 5, NE cor. SE SE, Section 28-27-7, had sand 2,695-2,735 feet, and was shot with 180 quarts and made 375 bbls. John Rodgers has spudded No. 7, SW cor. NE NE, Section 33-27-7. Dixie Oil Co.'s No. 1, NW cor. SE SW, Section 34-27-7, is spudded. Greenland Oil Co. has a dry hole in No. 2, SW cor. NW NW, Section 34-27-7. Tidal Oil Co. and the Great Southern Co.'s No. 33, NE cor. SW SW, Section 16-26-8, had sand 2,400-2,517

(Continued on Page 176)

750 feet in No. 8, C SE SW, Section 31-21-12. Devonian Oil Co. and Elliott have completed No. 9-A, NW cor. NE NW, Section 20-20-12. Sand was 2,086-2,109 feet and the well was shot with 2 and with 5 quarts and is swabbing 18 bbls.

Okmulgee District

R. O. Slates is rigging up No. 5 Jefferson, CEL NW NE, Section 19-15-12. Phillips Petroleum Co. has the rig up for No. 1 Burnett, SE cor. NE, Section 23-15-12. W. E. Hammon has spudded No. 2, NE cor. SW NW, Section 35-15-12.

North of Youngstown, Penrod & Thompson have spudded No. 1 Barnett, SE cor. SW NE, Section 1-14-11. Prairie Oil & Gas Co. has a failure near Preston, in No. 3, SE cor. SW NW, Section 12-14-12, which is abandoned at 3,416 feet. Kingwood Oil Co. has spudded No. 2, NE cor. SE NE, Section 21-14-12. T. A. Johnston Co. and others have a rig on the ground for No. 5 Colbert, C SW NW, Section 22-14-12, and No. 6 Colbert, CNL SW NW, Section 22-14-12, is rigging up.

West of Bald Hill, Independent Oil & Gas Co. and Devonian Oil Co. have abandoned the location for No. 15 CEL SE SE, Section 7-15-13. Paige Brothers' No. 1, NW cor. SW SW, Section 18-15-13, is dry and abandoned at 2,765 feet. Vincent and others have a machine rigging up for No. 1 Anderson, SW cor. SE NE, Section 3-15-14. Transcontinental Oil Co. has completed a gas well in No. 1, NE cor. SE, Section 4-15-14, sand was 1,508-17 feet, and the well was drilled to a depth of 2,000 feet and plugged back and shot with 6,000,000 feet of gas.

Future Development Co.'s No. 1 Beams, SE cor. NE, Section 4-15-14, is rigging up. J. K. Gardner and others have a failure at 2,800 feet in No. 3, NW cor. NE SW, Section 32-14-13. Aksarben and others have a machine up for No. 9 Harris, CSL SE SE NE, Section 1-14-14. Elm Oil Co. is rigging up a machine for No. 6 Rentie, CSL SE NW, Section 13-14-14. Aggas and others have rigged up No. 4 Love, C NE NE, Section 16-14-14. Misener and others have spudded No. 17 Colbert, CSL NW NW SW, Section 16-14-14. Okliana Oil Co. is rigging up No. 9 Colbert, CSL NW SE, Section 16-14-14. T. D. Misener has a dry hole at 1,760 feet in No. 16 Colbert, CWL NW SW, Section 16-14-14. Casselman Brothers have spudded and shut down in No. 2 Anderson, CSL NW SE SW, Section 5-14-15.

West of Okmulgee, Cooper & Donnally have a rig on the ground for No. 1 Taylor, NW cor. NW, Section 7-13-10. The Texas Company has a rig up for No. 1 Harjoche, NW cor. SW, Section 27-12-10. J. C. Smith has a gas well in No. 2, SE cor. NW SW, Section 22-13-11. Sand was 1,080-95 feet and the well is good for 1,500,000 feet of gas. J. A. Swindler has spudded No. 7, C SW NE, Section 25-13-11.

J. H. Rebold has a gas well good for 5,000,000 feet of gas from sand 2,650-2,730 feet in No. 3, SW cor. SW, Section 29-13-11. Radcliffe Oil Co. has built a rotary rig for No. 1-W Randall, NW cor. SW, Section 33-13-11. McMahon and others have spudded No. 1, SW cor. SE SE, Section 3-12-11. Josey Oil Co. has built the rig for No. 15 McCoy, NW cor. SE NW, Section 33-12-11.

Seminole County

Prairie Oil & Gas Co. is moving in a rig for No. 1 Grayson, NE cor. SE SE, Section 33-10-6. F. C. Searight's No. 1-A, CSL SE NE NE, Section 33-10-6, had limey sand 4,045-4,120 feet and is making 265 bbls. daily. Carter Oil Co. and Gardner Petroleum Co. have moved in a rig for No. 1 Harjo, CEL SE SE, Section 35-10-6.

In the Cromwell Pool, the Continental Oil Co. is underreaming 6-inch casing at 3,475 feet, and will make a Wilcox sand test out of this well. Sinclair Oil & Gas Co. has spudded No. 9 Yarborough, SW cor. NW NE, Section 4-10-8.

Payne County

A. A. Bailey has spudded No. 1, NE cor. SW, Section 11-19-6. Josey Oil Co.'s No. 1, NE cor. SE NW, Section 2-18-5, is dry at 2,690 feet. Home Gas Co.'s No. 1, NW cor. NW, Section 30-18-6, is a failure at 3,830 feet.

Roxana Petroleum Corp.'s No. 3, SE cor. SW SW, Section 13-19-4, had sand 3,729-38 feet, and made 1,824 bbls. the first 24 hours. Prairie Oil & Gas Co. is drilling at 975 feet in No. 1, SE cor. NW SE, Section 14-19-4. Shaffer Oil & Refining Co. has cemented the 15-inch casing at 895 feet in No. 1, NW cor. SE NE, Setcion 10-18-4.

Creek County

Kirchner and others have a rig on the ground for No. 1 Filson, SW cor. SE NE, Section 23-17-10.

In the Mounds district, Henry & Avers and the Amerada Petroleum Corp. have a machine in for No. 1 Dolman, NW cor. SE NE, Section 25-16-11. Spears and others' No. 1, SW cor. SE, Section 5-16-12, is dry and plugged at 2,090 feet.

Alvord & West have spuddd No. 4, CEL NW SE, Section 14-17-8. Barnsdall Oil Co. has the rig on the ground for No. 3 Mitchell, SW cor. SE, Section 22-17-8. Interocean Oil Co. has the rig up for No. 4 Bigpond, CSL SW NE NE, Section 27-17-8. Southwestern Petroleum Co.'s No. 1, SE cor. NW NE, Section 27-17-8, had sand 3,095-99 feet and made 563 bbls. the first 20 hours and 828 bbls. the next day; the rig is on the ground for No. 2 Bruner, NW cor. NE, Section 27-17-8.

In the Bristow region, the Margay Oil Co. is drilling at 975 feet in No. 3, NE cor. SE NE, Section 9-16-8.

In the Skelly-Ford territory, the Mid-Continent Petroleum Corp.'s No. 7, SW cor. SE NW, Section 8-15-6, is spudded.

Skelly Oil Co.'s No. 13, NE cor. NW SE, Section 12-14-8, had sand 2,369-91 feet and made 40 bbls. naturally. It was shot with 120 quarts and made 75 bbls. C. G. Tibbens has a rig on the ground for No. 10 Sewell, NW cor. NE NE, Section 13-14-8.

Suppes and others have a dry hole near Sapulpa in No. 3, CSL SW SW, Section 34-19-12, which is abandoned at 2,295 feet.

Gray Oil Co. has spudded No. 2, NE cor. NE, Section 3-18-11. Sunray Oil & Gas Co. has the rig up for No. 5 Gray, CSL NE NW, Section 6-18-12.

Wagoner County

F. C. Deems is drilling at 375 feet in No. 1-A, CNL NW SW, Section 31-18-15.

Tulsa County

Holmes and others' No. 1, CEL NE SW, Section 11-17-13, had sand 1,460-78 feet and is pumping 30 bbls. after a shot of 120 quarts. H. E. Detrick has a dry hole at 2,197 feet in No. 1-A, NE cor. SW, Section 21-16-13. Hutchinson and others are drilling at 350 feet in No. 3 Anderson, CNL NW NE, Section 34-16-13.

S. P. Hazen and others have spudded No. 1-A Simons, NE cor. SW SW, Section 11-18-13. Ellen Oil & Gas Co.'s No. 1-A, NE cor. NE, Section 25-18-14, is drilling at 750 feet. Thomas Green and others have rigged up a machine for No. 2 Flippen, NW cor. SW SE, Section 28-18-14. Potoula Petroleum Co.'s No. 1, NE cor. NW NE, Section 8-17-14, is dry and abandoned at 2,220 feet.

Pawnee County

Magnolia Petroleum Co. has spudded No. 2, NE cor. NW SW, Section 9-20-6; and the rig is built for No. 4 Gowling, NW cor. SW SW, Section 9-20-6, and for No. 3 Truesdale, NW cor. SE NE, Section 17-20-6. The Josey Oil Co. has drilled an old well deeper in No. 2, NW cor. NW, Section 22-20-6, and found sand 3,095-3,112 feet and the well is making 3,000,000 feet of gas and 20 bbls. of oil. Westerly Oil Co.'s No. 5, SW cor. NW SW, Section 22-20-6, had sand 3,350-86 feet with a show of water in the bottom. It was plugged back to 3,382 feet and shot with 5 quarts and made 188 bbls.

Kay County

Harold and others have a rig up for No. 4 Case, NW cor. SW, Section 4-27-1w. Schonwaldt and others have a rig up for No. 1, SW cor. NW, Section 4-27-1w. Blackwell Oil & Gas Co. has rigged up No. 2 Jamieson, NE cor. SE Section 5-27-1w; and No. 1, NE cor. SW, Section 8-27-1w, is spudded. Marland Oil Co. has a rig up for No. 1, NE cor. SW, Section 19-27-1w. Same company is building the rig for No. 1 School land, NE cor. NW, Section 13-25-2w.

Marland Oil Co. and the Barnsdall Oil Co. have a failure in No. 1, NW cor. NE, Section 32-28-5, which is abandoned at 3,625 feet.

Lincoln County

The Amerada Petroleum Corp.'s No. 4, SE cor. NE SE, Section 2-14-5, had sand 3,409-42 feet and made 150 bbls. after a shot of 100 quarts. Carter Oil Co. has spudded No. 8, SW cor. NE NE, Section 2-14-5. Amerada Petroleum Corp. has built the rig for No. 8 Belles, CNL NW NW SW, Section 3-14-5. Pure Oil Co. has spudded No. 2, SE cor. SE, Section 4-14-5. Magnolia Petroleum Co. has the rig up for No. 2 Chapman, NE cor. NW SE, Section 10-14-5. Sinclair Oil & Gas Co. has the rig in for No. 1 Garret, SE cor. SW SE, Section 27-14-5.

Jefferson County

Brown and others' No. 3, NE cor. NW, Section 33-6s-5w, is dry and abandoned at 1,380 feet. Staley & Wynn have a failure in No. 1, SW cor. SE SW, Section 2-7s-6w, at 2,257 feet.

Carter County

Coline Oil Co. has a rig on the ground for No. 4 Higgins, SE cor. NE, Section 7-2s-2w. Roxana Petroleum Corp. has completed No. 3, NE cor. SE SE, Section 7-2s-2w. Sand was 2,460-95 feet and the well is pumping 170 bbls.; No. 4, NE cor. SE, Section 7-2s-2w, had sand 1,673-87 feet and the well pumped 60 bbls. the first day. Magnolia Petroleum Co. has rigged up standard tools for No. 2 Johnson, NW cor. SW, Section 15-2s-2w, and is building the rig for No. 1 Pierce, SW cor. SE, Section 15-2s-2w; No. 1, SE cor. NE SE, Section 16-2s-2w, had sand 1,260-78 feet and pumped 30 bbls.; the rig is built for No. 2 Johnson, NE cor. SE, Section 16-2s-2w, and also for No. 1 Parrish, SW cor. NW NW, Section 23-2s-2w.

Southerland Petroleum Co. has completed No. 8, CSL SE NE SE, Section 16-4s-2w. Sand was 1,580-1,665 feet and the well pumped 15 bbls. the first day.

Stephens County

The Carter Oil Co. and Knox Petroleum Co.'s No. 6, NE cor. NW, Section 2-2-5w, had sand 1,469-98 feet and is pumping 90 bbls. Magnolia Petroleum Co.'s No. 1, NE cor. NW SW, Section 32-1-5w, had gas sand 1,675-77 feet and oil sand 1,687-1,725 feet, and is estimated at 2,000,000 feet of gas and 25 bbls. of oil. Same company has set the surface casing in No. 3 Brigsley, SE cor. NE SW, Section 30-2-9w. Petroleum Producing Co. has a rig up for No. 1 Morrison, SE cor. SE, Section 11-1-8w. The Carter Oil Co. is rigging up standard tools to drill deeper in No. 7 Ridge, CWL SW NW, Section 30-1-8w.

The Carter Oil Co. has rigged up a rotary for No. 1 Lambdin, SW cor. SE, Section 28-1s-8w. Brannon and others have a dry hole in No. 3, CWL NW NW NW, Section 35-1s-8w, at 1,700 feet. Pace and others' No. 1, SE cor. NE NW, Section 11-2s-8w, had sand 2,136-44 feet and pumped 12 bbls. Magnolia Petroleum Co.'s No. 2, NE cor. SW SW, Section 12-2s-8w, had sand 1,500-15 feet

(Continued on Page 183)

MIDWEST TO START THREE NEW TESTS ON SEPARATE UTAH STRUCTURES

By F. B. Taylor
Staff Correspondent, Rocky Mountain Area

CASPER, Wyo., May 1.—The Moab well of the Midwest Refining Co. and the Utah Southern Oil Co. is still trying to get a water shutoff about 2,000 feet. The hole is filled with mud so there is no chance of the well flowing.

The Shaffer structure well is down about 600 feet; this is a test on a separate structure from the Cane Creek where the first or discovery well is located. Besides these two wells, the Midwest is preparing to start three other wells, each one on a separate structure, the Elk Hills, Cedar Mesa and Lime Ridge.

The Utah Oil Development Co., on Section 8-26-22, started spudding the past week. The Home Oil Co. on Bitter Creek Dome is at 710 feet on Section 4-19-25. Utah Southern Oil Co. is drilling at 1,150 feet on Section 27-41-19 on the San Juan structure. The Marland Oil Co. has a fishing job at 2,440 feet on Section 35-21-16 and the Western States Development Co., on Section 27-21-19, has a hole at 1,200 feet, drilled with a machine and is changing from machine to standard rig. Embar Oil Co., on Section 34-25-21, Moab structure, is pulling in the hole and will run a string of 3-inch to bottom at 2,870 feet; on the same structure, Section 20-25-21, the Empire Petroleum Co. has a small machine ready to spud in and the Cresent Eagle Oil Co., Cresent Dome, Section 4-22-19, is cleaning out its well that has been standing for some time and will drill deeper.

New Sunburst Producers

Sunburst Field in Montana has brought in eight new producers. The Tri State Oil Co., on Section 30-35-1, east side of the field, brought in two good wells in the Ellis sand at 1,460 and 1,475 feet. One well will do 200 bbls. and the other 800 bbls. The Weiser Syndicate on Section 6-34-1 found a duster in the Ellis sand with water. The Ferdig Syndicate on Section 35-35-2 went to 1,520 feet and passed through the Ellis sand finding it dry and the well is a duster. On Section 30-34-1, the Hungerford Oil Co. found enough gas in the Kootenai at 1,190 feet to make a gas well, but found no Ellis sand with deeper drilling; this well will be used to furnish fuel. The Dakota Montana Oil Co., on Section 31-35-1 found a 250-bbl. well in the Ellis sand at 1,450 feet.

On Section 4-34-2, the Signal Hill Oil Co. found the Ellis sand at 1,482 feet and the well will make 100 bbls. The Swift Current Oil Co. has a nominal producer of 20 bbls. in the Ellis sand at 1,496 feet on Section 27-35-2.

Salt Creek Field

In the Salt Creek Field, the Midwest Refining Co. has completed seven new wells. The Midwest Oil Co. has a producer making 87 bbls. on Section 26-40-79 at 1,767 feet. The same company has a well doing 100 bbls. on Section 34-40-79 in the second Wall Creek sand at 2,152 feet.

The Midwest Oil Co. and the Wyoming Associated Oil Co. operating jointly on Section 36-40-79 brought in a producer good for 100 bbls. at 1,045 feet; one on Section 13-40-79 that will make a small pumper at 1,845 feet, and another on the same section that is also a nominal pumper at 1,796 feet.

The Wyoming Oil Fields Co. drilled a well on Section 23-40-79, to the top of the Lakota sand at 2,444 feet and shut down. The Wyoming Associated Oil Co. has a small producer on Section 23-40-79 at 1,543 feet, estimated at 10 bbls.

The Ohio Oil Co. has a good well in the Grass Creek Field in the Big Horn Basin, estimated at 100 bbls., on Section 30-46-98, on the Milliron tract.

The Argo Oil Co. has abandoned the deep test in the Pilot Butte Field. This well was drilled with a machine and found oil in the Muddy sand with about 1,800 feet of open hole. The drillers ratholed ahead to see what the sand held and it is considered easier to drill another well than to try and ream out the small hole.

The New York Oil Co. is increasing its compression gas plant in Teapot to

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Forecast of Mr. Walter C. Teagle, President, Standard Oil Co. (N. J.), delivered before the Federal Oil Conservation Board at Washington, D. C., Feb. 10 and 11, 1926, quoted:

(From the official record as printed by the Government Printing Office, Washington)
(Italics used are ours)

"Where gasoline can be produced from fuel oil by cracking, cheaper than gasoline produced from the initial distillation of crude, self-interest will prompt the industry to install cracking equipment rather than run additional quantities of crude.

"This has been the trend of the industry during the past two years, a trend which will undoubtedly be more marked if in the future the existing differential between the price of fuel oil and crude be maintained or increased."

Universal Oil Products Company
Owners of the Dubbs Process
310 South Michigan Ave
Chicago, Illinois

Gasoline Oil in Demand in Gulf Coast

Drilling in Light Crude Fields May Be Stimulated As Result of Increased Prices. Production Decreases

By P. L. McGreal
Staff Correspondent, Gulf Coast Fields

HOUSTON, Tex., May 3.—Quotations posted by the Humble Oil & Refining Co., effective April 28, make B grade coastal crude of higher value than A grade, which has the greater lubricating content. "A" is posted at $1.50, while "B" having a gravity of 27 is $1.55, with a 5-cent advance on each point in gravity up to 35 and above which is $1.95 under the new schedule. This is a complete reversal of values. The Coastal crude was placed on a grade basis in March, 1923, the pipe lines defining them as "A" and "B". "A" grade had the greater value because it had the lubricating content. It ranged 25 cents above the "B" grade. This difference continued until July, 1925, when The Texas Company announced future purchases would be made on a gravity basis. That company never had established grades previously.

On March 10 last, the Humble Oil & Refining Co. announced a new grading of "B" on a gravity basis, establishing quotations below 25 gravity to 30 and above. The new schedule runs the gravities to 35 and above and applies to Goose Creek, Hull, South Liberty, West Columbia, Pierce Junction and Boling, the company having lines to those pools.

There are few so-called independent operators in any of those pools, or in fact in any of the Coastal pools. The companies are buying their own production on a gravity basis and about the only beneficiaries aside from themselves are the land owners or royalty holders.

Cracking Responsible

Modern improvements in refining methods makes it possible to now crack what was once considered worthless crude. That is the reason assigned for the advance in grades and quotations. It really means that Coastal B grade crude is now in competition with light gravity oils produced in other parts of the State. Already such pools as Pierce Junction and Blue Ridge are feeling the effects of the new grading in new work starting. In the old days these pools and others showed a high percentage of gas oil. Now the product is in demand for cracking.

Completions during the week number 20, of which seven were dry and two salt water with one gas well. The new production is 5,200 bbls. Ten wells are bailing at the close of the week.

Daily Average Production

The estimated daily average gross production for the week ending May 1, is placed at 99,940 bbls. against 104,007 bbls. last week. The south Texas pools are credited with 86,650 bbls. and south Louisiana with 13,290 bbls. Compared with last week, Boling decreased 2,192 bbls., Goose Creek, 150 bbls., Lockport, 2,565 bbls., Spindletop, 1,325 bbls. and Vinton 240 bbls. The Hull Pool increased 1,350 bbls., South Liberty, 600 bbls., and West Columbia, 375 bbls. The increases in the two latter is due to working over of old holes and reviving them.

The following is the estimate for each pool:

Pools—	Gross Bbls.
Boling	7,800
Batson	1,420
Blue Ridge	850
Big Creek	1,675
Barber Hill	105
Dayton	65
Damon Mound	825
Edgerly, La.	750
Goose Creek	9,800
Humble	4,850
Hull	22,100
High Island	50
Jennings, La.	1,165
Lockport, La.	4,900
Markham	70
Nash Dome	175
Orange	11,620
Orchard	110
Pierce Junction	1,850
Piedras Pintas	180
Spindletop	2,525
Saratoga	1,325
Sour Lake	4,325
South Liberty	5,750
Vinton, La.	6,400
West Columbia	9,650
Welsh-Anse La Bute, La.	75
Miscellaneous	130
Total	99,940

Southwest Fields

The estimated daily average gross output for the Southwest fields for the same period is placed at 38,555 bbls. compared with 38,715 bbls. for the previous week.

The estimate for each field is as follows:

Field—	Gross Bbls.
Luling	22,550
Mirando	6,625
Somerset	2,170
Callham	170
Rockdale-Minerva	940
Lockhart	6,100
Total	38,555
Grand total for week	138,495
Grand total last week	142,722
Net decrease	4,227

Luling Consistent

It is pertinent to remark here that the Luling Field is one of the most consistent producing areas in Texas. The wells make a world of water, but the amount of oil recovered seldom varies, notwithstanding the fact that very little drilling is being done there. The deep test of the United North & South Oil Co. in No. 1 Kelly, is around 5,970 feet. The field has upset all the predictions of the experts, who predicted a short life for it and rapidly declining production. The total production is now far beyond what the experts said would be the maximum when the output was flush. The runs of the Magnolia Petroleum line from the field during March were 214,394.75 bbls. and from the Lockhart Field 132,663 bbls. That company also ran 76,364 bbls. from the Mirando fields during March.

Coastal Completions

The best completion of the week was in the Boling Pool in Wharton County, where the Oxford Oil Co.'s No. 3 Floyd came in at 3,560 feet making 3,500 bbls. through a three-eighths-inch choker. The oil is 33 gravity. No. 2 Floyd, which came in last week, is flowing 1,650 bbls. The Sun Oil Co.'s No. 4 Taylor is showing gas at 3,960 feet, and the Vacuum Oil Co.'s No. 2 Hooper is in a sand showing oil at 3,700 feet.

The second completion of the Rycade Petroleum Corp. around the new Nash Dome on the line of Brazoria and Fort Bend Counties, 8 miles east of Damon Mound, was a gasser at 4,058 feet. Screen was set in 80 feet of sand. The location is 325 feet south of the discovery well. The gasser is No. 2 on the Flessner acreage.

Hull Pool

In the Hull Pool, the Gulf Production Co.'s No. 66 Phoenix came in flowing 1,100 bbls. early in the week at 3,700 feet. Late in the week it was making 600 bbls. The same company is bailing No. 27 Phoenix at 3,200 feet, following a work over. The Republic Production-Houston Oil Co.'s joint No. 123 Dolbear, is pumping 30 bbls. at 2,250 feet, and No. 120 Dolbear is bailing at 2,690 feet.

The Orange Pool is a blank this week, going past without a producer. The Humble Oil & Refining Co. got salt water in No. 25-A Chesson at 5,200 feet. The hole is being sidetracked for another test. The Rycade Petroleum Corp. abandoned No. 8 Cow Bayou, and the Texhoma Oil Co. abandoned No. 4 Chesson at 4,775 feet. No. 7 Chesson is bailing at 3,375 feet. The Gulf Production Co.'s No. 22 Hager fee on the east side of Cow Bayou is bailing at 4,625 feet, as is the Atlantic Oil Producing Co.'s No. 4 Hager, at 3,725 feet.

The Rio Bravo Oil Co.'s No. 2 Settegast on the north side of Pierce Junction, is flowing 500 bbls. by heads at 4,638 feet, after being worked over.

The Texas Company's No. 10 Robinson at Blue Ridge is bailing at 3,800 feet.

In the Sour Lake Pool, the Lake Graham Oil Co.'s No. 7 Bashara will pump at 2,260 feet. The Texas Company's No. 230 fee, is making 20 bbls. at 1,725 feet. The Gilbert Oil Co.'s No. 98 fee is an 8-bbl. well at 915 feet. The Yount-Lee Oil Co.'s No. 3 Gilbert is bailing at 4,150 feet.

In the Saratoga Pool, the Paggi Brothers Oil Co.'s No. 3 Ogden, is pumping 15 bbls. at 1,425 feet.

The Sinclair Oil & Gas Co. has a 15-bbl. pumper in No. 3 Condit in the South Liberty Pool at 3,425 feet.

In Other Pools

Hamm & Co. junked and abandoned No. 1 Bailey in the Humble Pool, and skidded the derrick to another location. The Brane Oil Co.'s No. 5 Perkins, in Humble Townsite is showing gas and oil in shale and sand at 2,475 feet.

The Humble Oil & Refining Co. abandoned No. 1 LeRebus on the northwest flank of the dome at West Columbia in heaving shale at 4,477 feet.

At Spindletop, Wilson & Broach's No. 48 Higgins is bailing at 750 feet, as is the Gulf Production Co.'s No. 190 Gladys at 800 feet.

In the Lockport (La.) district, near Lake Charles, the Vacuum-Gulf Co.'s Nos. 7 and 8 Miller both bailed salt water at 3,875 and 3,850 feet respectively. No. 9 Miller is bailing at 4,325 feet. Nos. 7 and 8 will be drilled deeper. No. 1 Friedberg & Wolf is deepening at 4,655 feet. No. 3 Farquhar is drilling at 3,500 feet and No. 4 Lock-Moore is around 2,000 feet.

Two wildcats were abandoned during the week. The Roxana Petroleum Corp. junked No. 1 Clements, State prison farm in the southern part of Brazoria County at 4,580 feet. The Gulf Production Co. quit No. 10 Davis at Long Point in Fort Bend County, at 800 feet, in gyp.

A number of Coastal contractors have shipped rigs to Duval, Jim Hogg and Webb Counties, where there is much activity at present. The development work centers around the Cole-Bruni district on the line of Webb and Duval Counties and north and south of the Henne, Winch and Fariss district in Jim Hogg County. Some big gas wells have been developed, but thus far but little oil has been located. The gas will be marketed in Houston and San Antonio. The Houston Pipe Line Co., a subsidiary of the Houston Oil Co., is starting a gas line extension south from Lucas, Live Oak County, to connect with the wells. The Southern Natural Gas Co. has extended its lines into Webb County. It supplies San Antonio.

Drilling in the Pools

More than 175 wells are drilling in the defined pools in the Gulf Coast region and outside in territory best described as semi-wildcat. For not much of the Coastal Plains Belt can be classed as absolutely wildcat. Practically all the counties in Texas and parishes in Louisiana bordering on the Gulf of Mexico have been drilled over and over during the past 25 years. And nearly always there was just enough showing of either oil or gas or both to lure the wildcatter to go back. Nearly always there is the belief that the other fellow "passed up" something significant, which he hopes to find. Another reason for raking over the old territory finds expression in the statement that in

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TEST WEST OF MEXIA STILL UNCERTAIN AT END OF WEEK

By Special Correspondent

MEXIA, Tex., May 1.—The Transcontinental Oil Co. set 4½-inch pipe with packer in its No. 1 Ross, Varela survey, west of the Mexia Field and on Friday began bailing, but the salt water, which was believed to have been coming through split 6¾-inch casing was not exhausted. It was still believed that the water came from above.

The test on the Ross farm caused the biggest campaign in fractional royalty deals of any well being drilled in the east central territory in a long time. While it may easily be said that $400,000 in lease and royalty deals were made in Mexia, the estimate on the amount of money that changed hands ran as high as $800,000. As soon as the news of the first core and its oil content got out the dealing began in earnest and it was revived after the last core was taken and the belief again became prevalent that the water intrusion was not from the sand.

The Navarro Oil Co. was drilling gypsum at 180 feet in its No. 1 Smuller, Saliser survey, Anderson County.

In Cherokee County the Humphreys Corp. set 15¼-inch casing at 1,400 feet in No. 1 Ousley, Dillard survey. The drill pipe was stuck when the well was last visited. Humphreys Corp. & Collington had not started drilling No. 2 Clapp, Jewell survey, 75 feet west of the well which had to be junked at 3,384 feet.

In Ellis County the Sims Oil Co. had a fishing job at 2,640 feet in No. 1 Griffiths, De La Pana survey.

The Patterson Lake Oil Co. has abandoned No. 1 Bounds, Pierson survey, Freestone County at 3,180 feet. It was dry all the way.

In Hunt County the Gulf Production Co. was drilling at 4,315 feet in hard lime in No. 1 Hicks, Bordine survey.

In Limestone County the Pure Oil Co.'s No. 3 Lidley, McNulty survey, a shallow test was a hole full of water at 1,445 feet and was abandoned. The Magnolia Petroleum Co. was drilling at 2,952 feet in No. 8 Desenberg, P. Varela survey, after setting 6⅝-inch casing at 2,949 feet. Reiter & Foster & Lucas and Lewis' No. 1 DeLong, Verala survey, was drilling at 2,512 feet. The Austin chalk was found from 2,131 to 2,484 feet. Swearingen & Collicotte's No. 1 Locke, Thompson survey was drilling at 2,177 feet.

In Navarro County the Penn, Black and the Atlantic Oil Producing Co.'s No. 1 Kenner, Love survey, was abandoned at 1,850 feet. Garland Kent's No. 1 K. Woolens, J. D. Matthews survey was drilling at 2,592 feet, top of the Austin chalk at 2,432 feet.

All the tests in the territory not reported here were shut down.

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Drilling Is More Active in California

Doubtful If Production Will Drop Below 600,000-Bbl. Averages for Some Time. Possibility of An Increase

By L. P. Stockman
Staff Correspondent, California Fields

LOS ANGELES, Calif., May 1.—Development work has shown a very decided improvement in practically every section of California during the past few months and while the tendency at Long Beach will be to restrict further drilling as a result of the rather severe drop in production of wells in the northwest extension due to menacing water conditions, limited amount of sand from which to draw and uneconomical spacing of wells, additional work at Huntington Beach is expected to offset this drop to some extent. The most promising indication lies in the fact that the drilling being done at present is general in character instead of being centralized in any particular field, as has been the case during the past few years. Practically all of the San Joaquin Valley districts are making a better showing and this improvement is also quite pronounced in the Fullerton, Richfield, Coyote, Montebello and Whittier Fields in southern California where drilling has practically been at a standstill for several years.

State production has been holding pretty steady for the past several months and it is doubtful if it will drop very much below 600,000 bbls. daily for some time. On the other hand, it may register an appreciable increase as a result of additional drilling at Huntington Beach due to the lifting of drilling restructions recently in the town lot area and the inauguration of a deepening campaign at Inglewood. Operators at Inglewood are conducting their work in a very secretive manner and, while it has been reported on several occasions that a general understanding has been reached to hold up deep drilling in that area, this does not seem plausible in view of the fact that the Associated has not yet made any move to shut in its deep zone producer, No. 2 Vickers. It is quite possible and very desirable that deep zone development be delayed as long as possible but it looks like a pretty safe bet that there will be some additional work undertaken before the close of summer.

New Wells Completed

Drilling operations during the past week were productive of two new wells in the Ventura Avenue Field, four at Long Beach, three at Torrance, one at Huntington Beach and five in the Midway-Sunset area. The two new wells of the Shell at Ventura were of more economic importance and showed a larger output than the aggregate initial daily production of all other wells completed in the state during the period in question. There has not been any unusual activity among wildcatters, although two more locations were staked out during the past seven days, one by the Barnsdall and the other by the Union. The former will get under way shortly and test out its holdings in the Puente district where the company has about 600 acres under lease at Avocado Heights. The Union, which has built up a very enviable reputation as a successful wildcatter, is preparing to drill a test west of the Inglewood Field and about one-half mile north of the Sentinel's old wildcat abandoned about two years ago. The Union's new well will be located on the Howland ranch, which, together with other leases held in the vicinity, gives the company a little better than 1,200 acres of potential oil land. The area is worth a thorough test and geologists almost universally agree that there should be another field somewhere around Inglewood as the chain of fields extending from Newport Beach through Dominguez, Rosecrans and the Baldwin Hills shows a gap between Rosecrans and the Baldwin Hills, where no production has yet been developed, although probably a dozen exploratory wells have been put down in search of it.

Ventura

The Shell finished two excellent flowing wells in the Ventura Avenue Field during the past week, both of them on the Gosnell property, and it looks as though the company will add another producer to its list within a short time, as No. 6 Edison is looking quite promising at 5,200 feet. The Shell's two new producers were No. 18 Gosnell, which tanked 2,506 bbls. of 29.7 gravity oil during its initial test, and No. 19 Gosnell, which came in flowing 1,701 bbls. of 30.1 gravity oil during the first full 24-hour test. The former, which was brought in from 5,630 feet, is making a little better than 2,000,000 feet of gas daily, in addition to the oil produced, while No. 19 is making approximately 1,000,000 feet daily from a depth of 5,200 feet. The Shell did not start any new work during the week, although rigs are going up for No. 7 Edison and Nos. 11 and 14 on the Taylor property.

The Associated was obliged to temporarily suspend drilling on No. 11 Lloyd during the early part of the week, while additional hematite was added to the drilling fluid to prevent a blowout. At 5,236 feet the casing pressure was 600 pounds and it looked for a time as though it might get beyond control. No. 18 Lloyd at 5,189 feet and No. 27 on the same property at 5,227 feet are drilling ahead slowly and these wells will probably be added to the Associated's list of producers within a short time. The Bolsa Chica's No. 1 Hartman has another thousand feet to go but it could be finished in the upper sand right now at 4,370 feet if desired. The company will, however, carry it on down to the deeper zone because of the better production secured.

The General Petroleum is going along rather slowly with its development program in this field and has only two drillers on its drilling chart, No. 3-A Barnard at 4,289 feet and No. 10 Notten at 4,491 feet. The Petroleum Securities did not get a satisfactory water shutoff in No. 1 Willett in the southern part of the field and another cement job will be necessary at 3,941 feet. G. J. Magenheimer spudded in his No. 1 Hartman located in the extreme northern part of the district and has made 1,500 feet of hole to date.

Long Beach

The northwest extension at Long Beach yielded its usual weekly quota of new wells and, as has been the rule for the past month or two, most of them were comparatively small pumpers. The McKeon Oil Co.'s No. 7 Cerritos, which came in two weeks ago flowing 800 bbls. daily from a heretofore unproductive sand at 4,875 feet, is still cutting approximately 30 per cent water and there is some doubt as to whether any clean production can be anticipated in this new horizon. The log of McKeon's deep producer does not show a well defined oil zone but indicates the presence of a little better than 100 feet of sand and shale and because of the limited amount of data available it will be necessary to await the outcome of further work before anything definite can be ascertained as to the potentiality of this apparently new discovery.

There are about eight wells being carried down as deep tests at various points throughout the extension but it looks as though the Wilshire Oil Co.'s No. 1-B Cerritos at 4,706 feet and No. 1-C Cerritos at 4,800 feet will be the first to penetrate the new McKeon sand or zone, as the case may be. An attempt is being made to bring operators in the northwest extension together in an effort to consolidate their holdings, which will tend to cut down overhead expenses and if the plan is brought to a successful conclusion it is quite possible that some operators will eventually pull out of the hole. It is thought that groups of operators by consolidating their holdings will also be in a position to take advantage of the new and possibly productive deeper sand opened up by the McKeon's No. 7 Cerritos.

The largest of the new wells completed during the past seven-day period was the Lindauer Oil Co.'s No. 8 Cerritos, which came in doing 148 bbls. of 21.2 gravity oil daily from 4,515 feet. George F. Getty's No. 15 Cerritos, drilled to 4,428 feet and finished with a 6¼-inch liner, was only slightly smaller than this, as it registered an initial of 142 bbls., the oil testing 20.8 degrees and showing a cut of 2 per cent. Getty has one other drilling project in the extension, No. 16 at 4,342 feet, and he is making preparations to carry it down as a deep test. The California Petroleum's No. 1 Jotham Bixby, which is at present rotating ahead in a gray sand at 3,865 feet, will be watched very closely from now on and the company will undoubtedly begin taking more frequent cores, as this northeastern outpost is a very important marker and may even open up another independent structure.

J. W. Alford's No. 1 Cerritos started off pumping 130 bbls. daily from 4,450 feet but the output is cutting approximately 10 per cent water. A. J. Delaney's No. 33 Cerritos also showed considerable water and, as a result of an unsuccessful production test at 4,500 feet, drilling will be resumed and the well carried on down as a deep hole. L. T. Edwards listed a 128-bbl. pumper when his No. 2 Cerritos was put on the beam at 4,427 feet after being finished with a 4¾-inch perforated liner. Miller & Haley have started a location for a new test about a mile beyond the most northerly producer in the northwest extension but the site is not regarded with very much favor. The Marine Oil Corp. is making preparations to put No. 56 Cerritos on the beam at 4,420 feet and this well, together with George W. Johnson's No. 7 Cerritos, which tested wet a few days ago at 4,410 feet, should be on production shortly. The Modoc Oil Co. and Fred S. Roberts are running tubing in their respective drillers, while the Retsof Drilling Co. is putting Nos. 80-A, 81 and 82 on the beam.

Inglewood

No. 2 Vickers, the Associated's deep zone well in the Inglewood Field, came back flowing 25 bbls. an hour during the early part of the week and, since the total output during the first day only approximated 380 bbls., the company is making preparations to wash it out in an effort to stimulate production. It is thought that drilling mud has clogged up the perforations in the 6¼-inch and that a good production will be secured when this handicap is removed. The Associated started deepening this hole a month or so ago and recompleted it in the deep zone doing approximately 1,500 bbls. daily only to have it sand up a short time later. The company resumed work and deepened it still farther to 3,210 feet, at which depth bottom water was encountered. It was subsequently plugged back to 2,910 feet, from which depth it has just been returned to production.

It is problematical just what effect the recompletion of this well in the deep zone will have on the work of other operators in the field. It is logical to assume that companies having adjoining acreage would take immediate steps to drill offsets but the policy to be followed is still unknown because of the rather unsatisfactory outcome of No. 2 Vickers. The oil secured in the deep sand is of a much higher quality than that being produced in the upper zone and this will, no doubt, exert some influence in the future policy of operators as regards deep drilling.

When the Associated first started deepening No. 2 Vickers several weeks ago, the State Mining Bureau, realizing the necessity of establishing a uniform method of shutting off water, called a meeting of operators at which a definite plan was proposed. It was generally agreed at that time that the Associated was playing with dynamite and might precipitate a new drilling campaign in this field. It has since been reported that operators have come to a mutual understanding and that no additional work will be undertaken as far as the deep zone is concerned. This question has been accepted generally but no one has yet found out what will be done with the Associated's No. 2 Vickers.

If the company permits it to remain on production it is doubtful if the Standard and Petroleum Securities will sit back and congratulate the Associated instead of protecting their holdings by drilling offsets. There is only a limited amount of work being done in this field at the present time and as a result completions

(Continued on Page 170)

TANKER SHIPMENTS FROM LOS ANGELES TO ATLANTIC AND GULF COAST PORTS

Commodity—	Total This week	Daily Average	Total Last week	Daily Average	This year To date	Same time Last year
Crude oil	69,217	9,888	478,851	68,407	3,977,884	5,903,919
Fuel and gas oil	151,089	21,584	80,602	11,515	2,932,600	237,873
Gasoline	.....	.....	.....	.....	1,825,194	1,722,815
Tops	.....	.....	.....	.....	74,619	80,578
Coastwise—						
Crude oil	440,788	62,970	587,498	83,928	7,410,989	9,350,044
Fuel and gas oil	72,463	10,352	161,114	23,016	2,710,543	4,168,835
Gasoline	99,615	14,231	267,691	38,242	2,429,223	1,709,341
Kerosene	6,876	982	5,068	724	109,539	35,645
Tops	118,776	16,968	.....	.....	2,328,820	62,970
Exports—						
Crude oil	431,676	61,668	.....	.....	1,294,344	793,323
Fuel and gas oil	244,515	34,931	349,292	49,899	5,286,256	4,245,558
Gasoline	101,604	14,515	391,472	55,925	1,492,851	1,155,996
Tops	.....	.....	.....	.....	.....	170,407
Kerosene	.....	.....	139,011	19,859	758,018	594,588
TANKER SHIPMENTS, SAN FRANCISCO TO ATLANTIC AND GULF COAST PORTS						
Fuel and gas oil	.....	.....	73,511	10,511	359,177	.....
Gasoline	.....	.....	94,310	13,473	435,916	332,906
Tops	.....	.....	.....	.....	73,698	466,075
Lubricants	.....	.....	.....	.....	154,088	31,939
Coastwise—						
Fuel and gas oil	243,004	34,715	47,223	6,746	1,380,153	1,003,719
Gasoline	44,872	6,410	30,100	4,300	1,152,003	396,765
Kerosene	4,047	578	.....	.....	130,410	107,944
Exports—						
Fuel and gas oil	108,106	15,444	.....	.....	1,002,515	415,399
Gasoline	23,225	3,318	70,171	10,024	535,178	147,410
Kerosene	210,005	30,001	8,958	1,280	648,012	267,406
Lubricants	.....	.....	.....	.....	.....	243,602

There would be practically no evaporation loss from oil at the bottom of a 10 foot diameter tank 880 feet high—

But who ever had a tank 880 feet high!

The tall narrow slot —the Wiggins principle.

THE Wiggins principle of having the only oil surface exposed to evaporation that beneath a tall, narrow slot, is based on the same idea.

With a small oil surface at the bottom of a tall slot the conditions are such that directly over the oil surface there is a dead air space. This dead air becomes saturated with vapor. Being heavier than air, it is held by gravity immediately over the oil surface which it protects from further evaporation.

During ordinary operation of the Wiggins Roof even the narrow slot is closed except at the time the roof shoe travels over tank rivets and seams. The shoe is so suspended that its own weight throws it flat against the tank side and keeps it there.

The Wiggins Seal—the gastight connection between the roof and the tank—practically eliminates losses through thermal breathing and separates oil entrained in air. Air, entering a tank through the filling line, loses its entrained oil beneath the seal and passes into the atmosphere through a mercury-sealed vent.

Wiggins Roofs are the most effective means of minimizing evaporation losses. Let us send you quotations on them for your present tanks or for new construction.

A tank 10 feet in diameter and 880 feet high would have these relative proportions. There would be a heavy oil vapor immediately above the oil surface that would prevent any further evaporation.

The Wiggins gastight seal which closes the space between the pan of the roof and the tank side. It practically eliminates evaporation from this area and minimizes losses through thermal breathing.

A Wiggins Roof installed on a large tank. The gastight seal is the white band between the tank and the roof.

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CHICAGO, 2128 Old Colony Bldg.
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SAN FRANCISCO, 1054 Rialto Bldg.

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May Extend Smackover Light Field

Test About Two Miles South Has Hole Full Oil From Deep Sand Horizon. Lisbon Field Is Again Extended

By James H. Dameron
Staff Correspondent, Louisiana-Arkansas

SHREVEPORT, La., May 3.—Probable extension of the Smackover light oil field almost 2 miles, Lisbon area extensions, increase in production of Urania and Lisbon Pools and testing of wildcat wells were the salient developments in the north Louisiana-Arkansas district during the past week.

H. L. Hunt's No. 1 Swilley, Section 28-16-16, in Union County and almost 2 miles south of production in the Smackover light oil field, apparently is extending the deep sand production of that area. The test is standing with a hole full of oil and the 4½-inch casing was set at 2,680 feet and the total depth of the hole is 2,683 feet.

The good showing of the test has created a new excitement in that area and Mr. Hunt is reported to have paid $43,000 for royalties in that area. How much royalty he obtained was not learned. Some oil men were of the opinion the test would flow after 2-inch tubing had been run.

The Hude & Aarnes' No. 2 Brown, Section 13-15-20, has thus far proven disappointing and failed to open deep sand production in the Stephens Field. The hole was bailed dry to 3,302 feet and 25 feet of fluid rose in the hole over night, half water and half oil. The oil tested 24.9 gravity and the temperature was 111 degrees. The test was cored to 3,305 feet and revealed a green sandy shale. The hole is to be deepened a few feet and tested again.

Lisbon Field

In addition to having production extended, the Lisbon Pool took a 3,000-bbl. jump in production to claim the attention of operators. The Imperial Oil & Gas Co.'s No. 1 Primm, NE NW, Section 21-17-16, has extended production one-half mile south. The well topped the pay at 2,135 feet and is in sand 27 feet. It made two small heads through the 2-inch tubing and is to be put on the beam. There is 1,500 feet of oil standing in the hole. Offsetting the Primm well, Ohio Oil Co.'s No. 1 Goodwin, Section 21-17-16, set casing at 2,125 feet.

To the west of production, Long and associates' No. 1 White, NE SW NE, Section 17-17-16, which blew in making 5,000,000 feet of dry gas, is in 36 feet of broken sand topped at 2,075 feet. The well is still making the same amount of gas but after blowing a few days it started spraying oil. It was ordered closed in.

The Reliance Drilling Co.'s No. 1 Dumas, NW SW SE, Section 10-17-16, failed to extend the pool's production that far east. The test was abandoned at 2,320 feet. The heart of the field is practically drilled up and many tests are rapidly drilling up the undeveloped but proven territory. The Gulf Refining Co. took another slice of acreage in that area in buying the lease on the SE half SE, Section 18-17-16, from the Slaughter estate at a reported cash price of $165 an acre.

Urania Leads State

Two wells completed some time ago contributed a great deal to Urania's leap upward in production to be the leading pool in the state from the standpoint of production. Another good well Saturday morning will boost the production of the field over the 13,000-bbl. mark, oil men predict.

O. W. Clark's No. 1 Tullos, Section 23-10-1e, completed in January for a 100-bbl. well at 1,503 feet, blew in last week while tubing was being pulled. It flowed at the rate of 3,000 bbls. daily, 30 per cent salt water. Later it caught fire and burned 36 hours before bridging over.

The other well to give Urania's production a healthy boost was Love and associates' No. 2 Zimmerman, Section 25-10-1e, which had been completed a few weeks ago for a 150-bbl. well at 1,504 feet. Without being agitated the well started flowing 1,200 bbls. daily and has been steadily producing that much oil daily since that. The stream of oil was directed into earthen storage and pumped into steel storage.

Yeary & Bristol's No. 1 Urania, Section 8-10-2e, is apparently extending production one-quarter of a mile north. It is reported to have a good showing of oil at 1,513-15 feet. South of Urania and near Georgetown, the Gulf Refining Co. announced location for a wildcat test on the Swope lease, 320 feet north and 320 feet east, Section 18-19-1e. The test is being drilled on the strength of the oil showing in the Dowling & McCurry test in that area.

In Caddo Parish, the Gulf is testing the Nacatoch sand at No. 1 J. M. Byrd, Section 2-19-14, on the way down to the Trinity. The sand was reached at 964 feet and penetrated 4 feet. The hole could not be bailed down Saturday and is almost full of salt water with a good oil showing.

The Ohio Oil Co.'s No. 18 E. K. Smith, Section 12-21-15, in Caddo Parish, was bailed dry at 3,870 feet where a coring revealed a show of oil. Three-inch pipe is being run into the hole and the test is to be deepened.

Jim Askew leased 400 acres, near Lewis in the old Caddo Field, owned by the Crystal Oil Refining Corp. By the terms of the lease he is to drill five tests to the Nacatoch or chalk rock and to hold the deep oil rights on the acreage he is to drill a deep test within a year.

The jump in production in Lisbon and Urania, both of which went above 10,000 bbls. for the first time, gave each state a substantial gain and sent the combined production of the two states climbing 6,000 bbls. over the previous week's figures.

Production by Fields

Louisiana	
Bellevue	2,500
Caddo light	8,600
Caddo heavy	2,165
Cotton Valley	8,585
De Soto and Red River	3,940
Elm Grove	535
Haynesville	10,300
Homer	5,780
Urania	11,960
Total	54,365
Arkansas	
Smackover heavy	132,745
Smackover light	17,640
El Dorado	7,430
Lisbon	10,495
Nevada	3,025
Stephens	1,875
Total	173,210
Total both fields	227,575
Total last week	221,575
Difference	6,000

Lisbon Area Completions

The Lisbon area accounted for more than half of Union County's completions during the past week and its 11 new oil wells' combined production was 2,275 bbls. One gas well making 5,000,000 feet of gas and spraying a little oil was completed.

Magnolia Petroleum Co.'s No. 3 Dumas, Section 9-17-16, led the list when it was finished in sand at 2,094 to 2,129 feet making 700 bbls. naturally and the Atlantic Producing Co.'s No. 5 Slaughter, Section 9-17-16, was second with 600 bbls. initial in sand at 2,077 to 2,102 feet. Atlantic's No. 1-B Andress, Section 16-17-16, was completed in sand at 2,119-41 feet, flowing 100 bbls.

Magnolia completed two other wells in Lisbon during the week. No. 4 Dumas, formerly No. 2, Section 9-17-16, is good for 125 bbls. on the pump in sand at 2,068-94 feet, and No. 3, on the same lease, is making 125 bbls. naturally in sand at 2,116-41 feet. Marine Oil Co.'s No. 5 Slaughter, Section 9-17-16, is making 200 bbls. at 2,077 to 2,103 feet. Owens and associates' No. 2 Slaughter, Section 4-17-16, is flowing 175 bbls. from broken sand at 2,109-54 feet.

The Reliance Drilling Co.'s No. 1 Dumas, Section 10-17-16, was abandoned with the casing in the hole at 2,320 feet. Rovenger Oil Corp.'s No. 1 Graham, Section 16-17-16, was completed in 24 feet of sand topped at 2,100 feet and is flowing 25 bbls. daily. Smith Oil Corp.'s No. 1 Dumas, Section 10-17-16, the farthest northeast test, was completed in sand at 2,077-95 feet and is making 40 bbls. daily on the pump. Wingfield and associates' No. 5-A Dumas, Section 9-17-16, was completed in sand at 2,098 to 2,118 feet, pumping 200 bbls. daily, and T. J. Woodley's No. 2 Dumas, same section, was finished for a 75-bbl. pumper at 2,118-51 feet. To the southwest of the pool, Long and associates' No. 1 White, Section 17-17-16, was shut in for a gas well making 5,000,000 feet of gas and spraying some oil from 36 feet of broken sand topped at 2,075 feet.

Tests Due for Completion

Many of the tests in Lisbon are due to be completed in a few days, several are waiting for cement to set and a few are waiting for standard rigs.

Atlantic's No. 2-B Andress, Section 16-17-16, is in sand 25 feet topped at 2,103 feet and has 1,000 feet of oil in the hole. No. 3-B on the same lease is being rigged and Atlantic's No. 1 Goodwin, Section 16-17-16, is a rig. Six and five-eighths inch casing was set at 2,047 feet at No. 6 on the Slaughter lease, Section 9-17-16. Bond & Evans' No. 2 Kilgoe, Section 4-17-16, is drilling at 1,520 feet. Foster & McWilliams' No. 2 Mooty, Section 15-17-16, is drilling below the 1,850-foot level. Hickman and associates' No. 1 Slaughter, Section 3-17-16, is drilling at 150 feet.

Humble Oil & Refining Co.'s No. 1 Goodwin, Section 16-17-16, is drilling at 1,375 feet. On the Slaughter lease in Section 9-17-16, Humble's No. 1 is waiting for cement to set at 2,075 feet and is fishing for the bit at 1,240 feet at No. 2. Imperial Oil & Gas Co. is building a derrick for No. 2 Primm, Section 21-17-16, on the strength of the showing made by No. 1 which is sand at 2,135-62 feet with a good showing of oil. Six-inch casing is being run to 2,085 feet at Keisker and associates' No. 1 Harrell, Section 15-17-16. J. P. Kelly's No. 1 Mitchell, Section 20-17-16, had the sand at 2,155-58 feet and is arranging to set casing.

On the Dumas lease in Section 9-17-16,

AREA BETWEEN BIG LAKE FIELD AND LEA COUNTY, N. MEX., TO BE ACTIVE

By Special Correspondent

ARTESIA, N. Mex., May 1.—An extensive wildcat drilling campaign between the Big Lake Field in Texas and the Maljamar Oil & Gas Corp.'s wildcat well in Section 21-17-32, Lea County, New Mexico, will be under way within the next 90 days, according to information available here. The picking up of a new pay in the Maljamar's well, at a depth of 3,603 feet, during the past week has been followed by active trading, many large blocks of acreage being obtained by both the majors and independents. While no geology has to date been worked out, a preference is being shown for that acreage following the line of the cap rock which trends in a southeasterly direction, this running through the northeast quarter of Township 16, Range 31 Eddy County, through the southwest quarter of Township 16, Range 32, Lea County, across the northeast quarter of Township 17, Range 32, the southwest quarter of Township 17, Range 33, northeast quarter Township 18, Range 33, southwest quarter, Township 18, Range 34 and the northeast quarter, Township 19, Range 34. While commonly called the cap rock, many geologists class this formation as an escarpment and a number of operators are firmly convinced that it will have considerable bearing on the obtaining of production.

The first showing from the new pay in the Maljamar was encountered at 3,595 feet, cuttings when washed showing considerable oil. At 3,601 feet the lime softened sufficiently to allow the oil to come through and with the bit 2 feet in, the hole is standing 200 feet in fluid. The crew, after straight-reaming, are setting 6⅝-inch casing. The gas, which was encountered at 3,115 feet, will be bradenheaded and the well drilled to completion.

Crude of High Gravity

A test of the crude from the well, made by both the Sullivan and Continental refineries, showed it to run close to 36 gravity with a 35 per cent gasoline recovery, being similar to the oil from the Artesia pool. Another location has been made by the Maljamar interests, this being on the William Mitchell permit, in the SW SW, Section 17-17-32. As soon as the validation work has been completed on the various Maljamar locations, heavy type equipment will be moved in. Completion of these tests and the drilling of a well on the cap rock by the Marland Oil Co., together with several other tests going down to the south and west, will fairly well define the Maljamar Pool.

In the proven area, Flynn, Welch & Yates have completed their No. 44 in the NE NW, Section 9-18-28. The Frontier Petroleum Co. has a nice completion in its No. 4 on the McQuigg Brothers lease, Section 4-18-28, which is making 200 bbls. flush. Work of getting this company's No. 2 on production has been delayed due to a bad fishing job with the bailer in the hole.

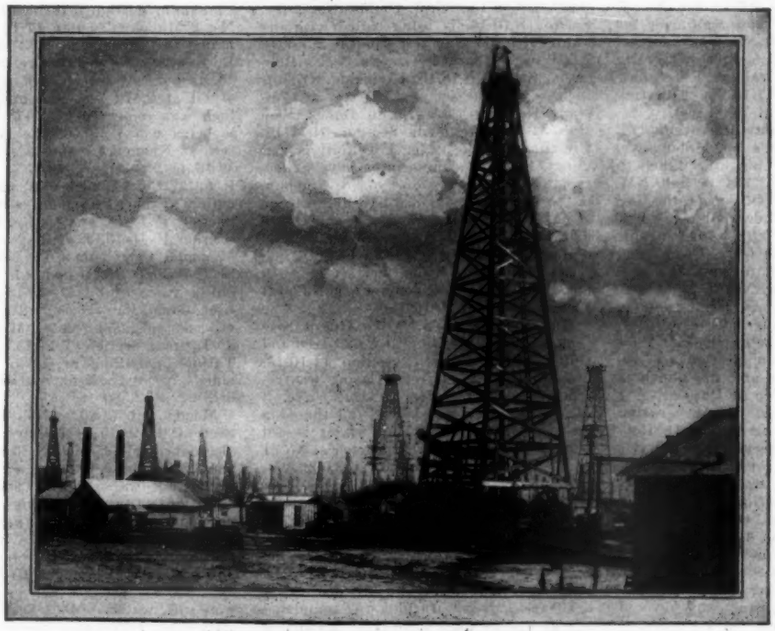
A 2-mile extension, it is believed, has been made to the north of the field, with the picking up of a sandy lime in the Navajo Oil Co.'s No. 1, in Section 28-18-28, which topped 8 feet of pay at a depth of 2,004 feet. This was estimated as good for 25 bbls. The well will be carried down, however, to the New States sand.

The Ohio Oil Co. is preparing to deepen its No. 5 Toomie-Allen in the NE NE, Section 28-18-28. This company has abandoned its No. 1 Edgerton in the NW NW, Section 18-18-28, at a depth of 3,008 feet. Another hole to be abandoned is Shaw & Rathke's No. 1 in Section 20-18-28, at a total depth of 3,408 feet.

Drilling Report

Decum Development Co.'s No. 1 Vandagriff, NE cor. SE, Section 5-17-28, shut-

(Continued on Page 169)



Lindley No. 1, Wortham Field, Texas. Byers Tubing. In over one year not a single shut down on account of tubing trouble.

In a Field full of Crooked Holes
Byers Tubing sets unique record

Look for the *Spiral Stripe* on Byers Pipe

Also name and year rolled in metal

THE Wortham field in Texas is considered very severe on tubing because of its many crooked holes. Under such conditions, the tough genuine wrought iron pipe shows itself to best advantage. Its metal is fibrous, rather than crystalline; hence it is like a wire cable in that it readily adjusts itself to bends without danger of fracture. Its ability to withstand constant vibration, shocks and strains has never been equalled by steel. That is why, for example, leading railroads equip cars and locomotives with Byers Pipe; and that is why Byers tubing, when put to severe test, invariably outlasts steel by many years.

Stroube and Stroube, Oil Operators, of Corsicana, Texas, have this to say about Byers tubing:

"In February, 1925, we equipped our Lindley No. 1 at Wortham with Byers genuine wrought iron tubing and have been using it every day without one moment's loss of time due to tubing trouble—indeed a remarkable record since the Wortham field is severe on tubing. We are highly pleased with the excellent service we are getting from Byers tubing at Wortham and elsewhere. We are equipping all of our wells with your tubing and gladly recommend its use to other producers."

As a means of preventing costly shutdowns and loss of production, Byers Tubing repays you manifold its slightly higher first cost.

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the Magnolia Petroleum Co. has staked a location for No. 2, SE SE NE; built a derrick pattern for No. 5, NW E half SE NE; staked a location in the NE NW SE NE for No. 6 and rigging up No. 7 in the CWL SE NE. On the Slaughter lease in the same section Magnolia's No. 2 is drilling after setting the surface casing at 280 feet; No. 5 is drilling at 450 feet; a location was staked for No. 6, NE SW NE NE; location was made for No. 7 in the SE SW NE NE, and No. 8, in the SW NE NE is a derrick. Marine Oil Co.'s No. 1 Graham, NW S half NE SE, Section 16-17-16, is a derrick and No. 2 is drilling at 2,000 feet.

Other Union County Operations

Miller & Cottingham's No. 4 Slaughter, Section 9-17-16, is running the 6-inch to 2,085 feet and No. 5, CEL W half NW NE is being rigged. Offsetting the Imperial's south extensioner, Ohio's No. 1 Murphy, Section 21-17-16, is waiting for cement to set at 2,125 feet. Owens and associates were forced to junk the hole at 1,423 feet at their No. 3 Slaughter, Section 4-17-16, and are rigging up to start a new hole 22 feet west. No. 4, on the same lease, is being rigged. Pure Oil Co.'s No. 3 Dumas, Section 9-17-16, is drilling at 845 feet and the 6-inch is being run to 2,100 feet at Pure's No. 1 Slaughter, same section. Six-inch casing was lowered to 2,056 feet at J. D. Reynold's No. 4 Dumas, Section 15-17-16.

Rovenger Oil Co.'s No. 2 Graham, SW SE SE, Section 16-17-16, is rigging. Roxana Petroleum Corp.'s No. 1 Dumas, Section 9-17-16, is rigging. On the Roxana's Flournoy lease, Section 4-17-16, the 6⅝-inch casing is being run to 2,090 feet at No. 1 and to 2,078 feet at No. 2. No. 3, CWL SE SE, is being rigged up. Six- and five-eighth inch casing was lowered to 2,074 feet at Simms Oil Co.'s No. 3 Dumas, Section 9-17-16. Simms' No. 1 Kilgoe, Section 4-17-16, is drilling at 1,112 feet. On the Simms' Perry lease, formerly Moore lease, Section 16-17-16, No. 1 is drilling at 1,360 feet; 6-inch was set at 2,080 feet at No. 2 and at 2,064 feet at No. 3.

Six and five-eighths inch casing was set at 2,065 feet at Southern C.O.P. Co.'s No. 1 Slaughter, Section 3-17-16, and a derrick is standing for No. 2. Six-inch casing was set at 2,075 feet at Stock and associates' No. 1 Dumas, Section 10-17-16. On the Dumas "A" lease, Section 9-17-16, Wingfield and associates ran the 6-inch to 2,075 feet at No. 4; drilling at 400 feet at No. 7 and rigging No. 8. On the Slaughter lease, Section 9-17-16, 6-inch was lowered to 2,065 feet at No. 4; topped sand at 2,078 feet, penetrated it 29 feet and is waiting for a standard rig with 1,000 feet of fluid in the hole; the sand pump is being run to 2,107 feet at No. 8; No. 9 is drilling at 200 feet and No. 10 is drilling at 1,800 feet. Wingfield and associates' No. 2-A Slaughter, Section 9-17-16, had sand at 2,110-29 feet with 1,000 feet of oil in the hole and is waiting for a standard rig; T. J. Woodley's No. 3 Dumas, Section 9-17-16, is drilling at 1,810 feet.

Smackover District

The remaining oil wells completed in Union County last week were in the Smackover district. Sun Oil Co.'s No. 8 Hatfield, Section 6-16-15, is pumping 50 bbls. daily at 2,547-49 feet. Woodley Petroleum Co.'s No. 4 Bilyew, Section 8-16-15, was finished up in 7 feet of sand topped at 2,420 feet and making 150 bbls. on the beam. Eason and associates' No. 7 Murphy, Section 15-16-15, is in sand at 2,624-35 feet and is pumping 150 bbls. daily. Federal Petroleum Co. pulled the 4½-inch casing and set 5⅞-inch and is flowing 225 bbls. daily from sand at 2,606-17 feet. W. R. Keever's No. 5 Sanford, Section 17-16-15, is pumping 150 bbls. of fluid, 50 per cent salt water, from 2 feet of sand topped at 2,497 feet. Magnolia Petroleum Co.'s No. 3 Hessler, Section 8-16-16, is making 50 bbls. on the pump from sand at 2,599 to 2,607 feet. Simms Oil Co.'s No. 7 Cook, Section 16-16-15, is flowing 65 bbls. and making 4,500,000 feet of gas from sand at 2,631-47 feet. Simms' No. 1-A Murphy, Section 15-16-15, is making 100 bbls. of fluid daily, 98 per cent salt water, from sand at 2,447-54 feet. McGaha and associates have moved the rig and abandoned No. 1 Haney, Section 11-17-16, with the casing in the hole at 2,536 feet.

Arkansas Drilling Co. set surface casing at 104 feet at No. 1 Rogers, NE SW SW, Section 20-17-15. Six and five-eighths inch casing was set at 2,440 feet at Broderick & Calvert's No. 7-B Murphy, Section 8-16-15. G. J. Childs' No. 2 fee, Section 8-16-16, is being bailed with the swab in the hole to test sand at 2,597 to 2,604 feet. Clark & Greer's No. 3 Robinson, Section 6-18-15, is rigging. Eight-inch casing was set at 2,155 feet at Constant Refining Co.'s No. 6 Burns, Section 31-17-15, and in Section 34-17-15, Crestline Oil Co.'s No. 1 Telford is rigging. Eason and associates have a derrick pattern built for No. 8 Murphy, SE NW NW, Section 15-16-15. In the same section, Estes and associates are drilling out the plug at 2,546 feet at No. 3 Murphy. Junk was sidetracked at 2,565 feet and 5⅞-inch casing was set at 2,616 feet at Federal Petroleum Co.'s No. 6-B Lawton, Section 10-16-15.

Gulf Refining Co.'s No. 17 Alphin, Section 2-16-15, is drilling at 2,623 feet and Gulf's No. 2 Clawson, Section 14-16-15, is drilling at 2,514 feet. Casing was recemented at 2,567 feet at Gulf's No. 3 McMullen, Section 1-16-16, and the plug is being drilled out. High water forced a shut down at W. H. Harper's No. 1 Mathews, Section 34-16-16, at 2,002 feet. Hatfield and associates' No. 2 Ennis, NW NE NE, Section 23-17-16, is a derrick. Hollyfield and associates' No. 13 Giller, CWL NE SE, Section 10-16-15, is a derrick. Same operators set 5-inch casing at 2,625 feet at No. 2 Murphy, NW NE SW, Section 9-16-15, and are drilling at 2,630 feet. No. 2 Murphy was completed a year ago as Cook's No. 2 at 2,463 feet making 3,000 bbls. Howell & Knowles' No. 2 Springer, Section 36-17-16, is drilling at 975 feet. Six-inch casing was set at 2,727 feet at Humble Oil & Refining Co.'s No. 3-B Flenniken, Section 9-16-15. Arrangements are being made to test at 2,644 feet at Humble's No. 2-B Lawton, Section 7-16-15. H. L. Hunt's No. 1 Murphy, Section 33-16-16, tested only a small show of oil and considerable salt water in sand at 2,137-60 feet. Hunt's No. 1 Swilley, Section 28-16-16, was drilled to 2,683 feet and the 4½-inch casing set 3 feet off bottom.

Drilling Operations

Imperial Oil & Gas Co. is milling on the casing at 2,132 feet at No. 12 McClanahan, Section 6-16-15. E. M. Jones' No. 2 Murphy, Section 17-16-15, is being bailed to test sand at 2,637-50 feet. W. R. Keever's No. 6 Murphy, Section 8-16-15, tested salt water with a small show of oil at 2,472 feet and one joint of 6-inch was cemented at 2,473 feet. Junk is being fished out of the hole at 2,620 feet at Kennebrew and associates' No. 7 Williams, Section 3-16-15. Lion Oil & Refining Co. has a derrick pattern on location at No. 1 Coombs, SW SW NW, Section 25-18-16, and its No. 8 Flenniken, Section 10-16-15, is drilling at 2,025 feet. Magnolia Petroleum Co.'s No. 3 LeCroy, Section 17-16-15, tested salt water without a trace of oil at 2,645 feet and is shut down for orders. Six-inch casing was set at 2,556 feet at Magnolia's No. 3 Tatum, Section 7-16-15, and No. 4 Tatum is drilling at 1,865 feet. Magnolia's No. 6 Hatfield, Section 7-16-15, is drilling at 2,580 feet.

Mazda Oil Corp.'s No. 2-B Lawton, Section 10-16-15, formerly reported as abandoned at 2,354 feet, is coring at 2,437 feet. No. 6-R Lawton, same section, tested salt water with a small show of oil at 2,648 feet and is being plugged back to 2,617 feet. Murdock and associates are still trying to complete No. 7 Vestal, Section 17-16-15, into a commercial producer. The well pumped 15 bbls. of fluid at 2,680-94 feet, 98 per cent of which was salt water. Moorefield and associates' No. 1 Edwards, Section 2-19-18, is drilling in lime at 2,272 feet. Peer Oil Co.'s No. 1 Cook, Section 17-16-15, is drilling at 2,325 feet and their No. 5 Palmer, Section 9-16-15, is drilling at 2,075 feet. Arrangements are being made at Leo P. Purrul's No. 2 Smith, Section 17-16-15, which was dry at 2,756 feet, to plug back and test at 2,020 feet. Pure Oil Co.'s No. 9 Friend, Section 6-16-15, is being bailed to 2,534 feet to test casing. Six-inch casing was set at 2,601 feet at C. L. Saxon's No. 2 feet, Section 4-16-16. Sinclair Oil & Gas Co.'s No. 8 Flannigan, Section 6-16-15, is being bailed to test at 2,568 feet. The hole is being reamed to 2,631 feet for the 4½-inch casing at the Standard Oil Co.'s No. 12 McClanahan, Section 6-16-15. Four and one-half inch casing was set at 2,598 feet at Unity Petroleum Co.'s No. 2 Lawton, Section 10-16-15. Williams and associates' No. 2 Goodwin, Section 16-16-14, is drilling in sandy shale at 2,598 feet.

Ouachita County

Ouachita County's side of Smackover failed to produce much oil with its four completions. Gilliland Oil Co.'s No. 8 Kyle, Section 29-15-16, is making 75 bbls. of fluid on the pump, 75 per cent salt water, from sand at 2,293 to 2,306 feet. Southern C. O. P. Co.'s No. 4-A Umstead, Section 4-16-15, is pumping 50 bbls. daily from sand at 2,349-52 feet. Woodley Petroleum Co.'s No. 4-A Umsted, Section 4-16-15, is making 150 bbls. of fluid daily, half water and half oil, from sand at 2,355-59 feet. Gossett and associates' No. 1 Cosden, Section 21-15-19, is making 65 bbls. of oil on the pump from sand at 1,457-60 feet.

A. T. Grayson has a derrick standing for No. 1 J. W. Reynolds, SW NW, Section 21-14-17. H. M. Harrell's No. 2 Moline Timber, Section 17-12-17, is drilling at 612 feet. Humble Oil & Refining Co.'s No. 11-B Arnold, Section 26-15-16, is drilling in sandy shale at 2,615 feet. Imperial Oil & Gas Co.'s No. 7-A McClannahan, Section 6-16-15, had sand at 2,549-55 feet and is waiting for a standard rig. Magnolia Petroleum Co.'s No. 2 Murphy, Section 30-15-16, is drilling at 1,710 feet. Six and five-eighths inch casing was set at 2,265 feet at A. Meek's No. 4 Lagrone, Section 36-15-17. Ohio Oil Co.'s No. 6 Goodwin, Section 29-15-15, is being deepened and is drilling at 2,460 feet. The well was completed a few months ago at 2,422 feet making 50 bbls. of oil and 50 bbls. of water.

Phillips Petroleum Co.'s No. 1 Tate, Section 9-14-17, is a rig. Pure Oil Co.'s No. 12 Brister, Section 28-15-15, is drilling at 2,618 feet. J. D. Reynolds' No. 1 Ratch & Cartier, SE NE SE, Section 2-14-18, is a rig. Roxana Petroleum Co.'s No. 4-A Bennett, Section 32-15-15, tested salt water at 2,409 feet and is now fishing for 2-inch tubing. Simms Oil Co.'s No. 10 Hildebrant, Section 28-15-15, had sand at 2,624-41 feet and the 6-inch casing is being set on top of the sand. The hole was junked and abandoned at 2,626 feet at Simms' No. 5 T. Murphy, Section 29-15-15, and the rig moved 20 feet south where a new hole will be started. Smith Drilling Co.'s No. 3 Shirley, Section 36-15-17, is drilling at 750 feet. Standard Oil Co.'s No. 8-B Murphy, Section 29-15-15, is drilling at 2,553 feet. A short string of 4½-inch casing was cemented at 2,279 feet at Sunny Jim Oil Co.'s No. 3 Hicks, Section 27-15-16, and the hole is being bailed to test 1 foot of sand.

Buffalo Oil Co.'s No. 2 Davis, Section 22-15-19, had sand at 1,552-56 feet and has 1,000 feet of fluid in the hole and is waiting for a standard rig. El Dorado Union Oil Co. junked the hole at 2,115 feet at No. 1 Hall, Section 31-15-19, and skidded the derrick 60 feet west to drill a new hole. S. S. Hunter estate's No. 1 Dalton, SE NW NE, Section 21-15-19, is drilling at 350 feet. Six and five-eighths inch casing was cemented at 2,150 feet at Magnolia Petroleum Co.'s No. 1 Watson, Section 31-15-19. J. D. Reynolds' No. 1 Davis, Section 22-15-19, is drilling at 1,425 feet. Reynolds' No. 1 Sawyer, Section 22-15-19, set surface casing at 62 feet and is drilling at 850 feet.

Nevada County

Humble Oil & Refining Co. completed its No. 4-A Graves, Section 1-14-21, for a 200-bbl. well on the pump in sands at 1,123-33 feet. Humble's No. 1-B Graves, Section 1-14-21, is waiting for cement to set at 1,127 feet.

Columbia County

J. E. Crosbie's No. 1 Jones, Section 36-15-20, in the Stephens district, was finished up in sand at 2,109-17 feet and is

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ONLY TWO PAY WELLS COMPLETED IN MEXICO, BOTH IN PANUCO DISTRICT

By George Blardone
Mexican Bureau, The Oil and Gas Journal

TAMPICO, Mex., Apr. 30.—With only 11 completions and but 2 of them finishing in the pay the past week in the Mexican fields has been rather dull. Both of the pay completions belong in the Panuco district, the best well of the two being Empire Gas & Fuel Co.'s No. 5-A, Lot 11, in the West Maguabes sector, which is rated for 2,000 bbls. at the shallow depth of 1,348 feet. Mexican Gulf Oil Co.'s No. 3 Piedras is good for 500 bbls. at 1,775 feet, another shallow one.

The failures all belong to the northern fields. They follow: La Corona Petroleum Co.'s No. 13 La Polla is a junked hole at 2,085 feet. Mexican Sinclair Petroleum Corp.'s No. 13, Lot 1 Camolote finished a dry hole at 2,106 feet, and its No. 12 Gutierrez drilled into salt water at 2,050 feet. Transcontinental Petroleum Co.'s No. 9 Tanchicuin is a duster at 2,000 feet. National Lines' No. 41 Tanchicuin, a federal zone well, is reported full of salt water at 1,870 feet. The above characterizes the Panuco district. In the Caracol, Transcontinetal Petroleum Co.'s Nos. 238 and 256, Lot 4, are each dry at 2,350 and 2,430 feet, respectively. In the Ebano district, Mexican Petroleum Co.'s No. 11 Midway is a duster at 2,111 feet. Mexican Gulf Oil Co.'s No. 6 Caracol drilled into salt water at 2,850 feet.

At Panuco

In the Panuco district, the most interesting drilling test as the week ended is Mexican Gulf Oil Co.'s No. 18-A Lopez, which, at 1,320 feet in gray lime is showing gas. This Lopez sector is in the heart of the old Panuco Field, and when first drilled in it showed rather high gas pressures. Gulf's No. 4 Flores is in gumbo at 890 feet and its No. 11 Zuniga, its original lease, is in gray lime at 1,970 feet. La Corona Petroleum Co.'s No. 114 Salvasuchi bridged at 1,500 feet, and it is now fishing tools at 1,650 feet. Credito Petrolero's No. 9 Piedras is ready to spud; its No. 10 is in gray lime at 1,410 feet and its No. 29, Lot 31, West Maguabes is in pink lime at 1,920 feet. East Coast Oil Co.'s No. 35 Lag. Milpa is in white lime at 1,985 feet; No. 55 is in gray lime at 1,870 feet; No. 59 is in white lime at 1,970 feet; No. 61 is in gray shale at 650 feet and No. 64 is in gray lime at 1,958 feet. Ita Mex Oil Co.'s No. 21 West Maguabes is in lime at 1,830 feet. Mexican Sinclair Petroleum Corp.'s No. 20 Tananturo has cemented 8-inch in shells at 1,313 feet; No. 23 is ready to spud; No. 24 is in brown lime at 1,770 feet. National Oil Co.'s No. 16 Chijoles is in gray lime at 2,100 feet; and its No. 4 Herradura is gassing in gray lime at 1,800 feet. Transcontinental Petroleum Co.'s No. 25 Barbarena is in shale at 100 feet, and it has three more tests rigging in the Tanchicuin sector. Mordelo Vincent's No. 1 Tamante has cemented 8-inch in gray lime at 1,540 feet. Tampascos Oil Co.'s No. 15 Robles is in gray shale at 340 feet, and it is rigging No. 16. Territorial Petroleum Co.'s No. 5 West Maguabes is drilling in the San Felipe around 1,900 feet. Sanchez and others' No. 1 Tampuche has cemented 8-inch in

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Caldwell County, Texas, Test Dry

Reiter-Foster Corp. Wildcat South of Dale Fails to Produce, Although Structure Is There. Other Tests Likely

By B. D. Stevenson
Staff Correspondent, Southwest Texas Fields

SAN ANTONIO, Tex., May 3.—Reiter-Foster Oil Corp.'s No. 1 O. S. Alexander in Caldwell County, south of Dale, which proved a structure and has been exciting great attention as a possible discovery well in the Edwards lime seems a dry hole at 2,402 feet when 40 feet into the Edwards. It will drill a full 100 feet into the Edwards but hope of making a producer vanished at 40 feet in when the Edwards was porous but white.

Top of the Edwards was found at 2,365 feet and was brown color and stained with oil and with an oil odor but no production. The Gulf's Canady well drilled early in the year 3 miles southwest in the direction of the Luling Field topped the chalk at 2,365 feet, the same as the Alexander topped the Edwards. Ordinarily the Edwards lies about 450 feet below the Austin. The Brown test of the Reiter-Foster Oil Corp., 2 miles east of the Alexander, also got formations lower and the Murchison & Fain well on the north got them much lower.

The structure is there as worked out by the geologists but it failed to produce. Probability is that other tests will be made and probably the Gulf Co., which has drilled two, will drill again. Reiter-Foster's No. 1 Gomillion, north of Lytton Springs Field, has been abandoned at 2,017 feet. It topped the Edwards at 1,864 feet but found it dry.

Features of Week

George M. Ball's half-mile eastern extension of the Mirando Field in the Edgington Pool and the momentary expectation that the Reiter-Foster No. 1 Alexander, south of Dale in Caldwell, and the McClure well on the Ivan Vick tract in Bexar County, would top production or be dry holes were the features of the past week in the south Texas territory around San Antonio.

There is a 5-mile gap from the Aviators's, or Edgington, Pool on the north in Webb County to the Mirando Valley Pool in Zapata County on the south, which was the first pool in the field and was discovered by O. W. Killam. Production on the north stopped with the Edgington subdivision of the Puig Brothers ranch known as the Aviator Pool. Ball gave it several small extensions and then jumped a mile south and drilled the well on the northeast corner of the west half of Block 45 of the Bruni land. The new well is in the east half of Block 13 of the Bruni land and 150 feet south of the south line of the Edgington subdivision of the Puig Brothers ranch and a full half-mile east of the nearest production. The Mirando Field had been a shoestrong affair running due north and south and not more than a half-mile wide and any one place.

The new Ball well is a full mile east of a line running due north and south through the center of the field and might indicate a swing to the east at that point but the Ball well in the northeast corner of the west half of Block 45 of the Bruni land is a mile south and a full 1¼ miles west of the new well. Production in that territory is had at approximately 1,700 feet and below. Total depth of the Ball well is 1,766 feet and it came in swabbing about 700 bbls. It is a full half-mile east of the nearest production. It is one of the best wells in the field.

Murchison & Fain drilling No. 1 Miers, about 2 miles north of the Reiter-Foster well and nearer Dale at 2,323 feet was in the Austin chalk but a short distance. At 2,316 feet it was still in the Taylor Marl. The top of the chalk is usually somewhat ragged and is located only approximately but the well is evidently on the downthrow side of the fault. Compared with the Reiter-Foster well it is not looking particularly good. Two tests drilled by the Gulf Production Co., about 3 miles southwest of the Reiter-Foster test on the Alexander and in the direction of the Luling Field, earlier in the year each got the formations much lower than the Reiter-Foster test on the Alexander. Gulf Co.'s Canady test topped the chalk at 2,370 feet and its Magee test topped it at 2,208 feet. They help prove the structure in that district. Acreage sold as high as $60 and $70 an acre and above when the Gulf Co. was drilling its tests. It has sold several times that more recently.

In southern Bexar County Utah Texas Co.'s (Thomas S. McClure) drilling the Ivan Vick has been progressing very cautiously and coring most of the way and waiting for identifications. The well, according to all the geologists who have studied the area, is on a structure a good 100 feet high, proven by the logs of wells surrounding it. At 2,693 feet it was in the Del Rio and about to go into the Georgetown and has added a little to the depth, being at this time probably in the Georgetown.

Piedras Pintas Field

In the Piedras Pintas Field, at Noleda in Duval County, Humble Oil & Refining Co. is drilling at 4,023 feet, an even 400 feet below the No. 4 Walsh, the discovery well of the field. No. 5 at 4,023 feet is in the fifth sand carrying oil and has got a little more of it. The others were too thin for any one of them to make a well. Drilling is continuing with the expectation that the sands will thicken and if this proves otherwise liner will be set with screen opposite each sand and an effort made to make a well by hooking all the sands up together. The well is 450 feet southeast of the discovery well and it is understood drilling will continue as deep as possible. The last string of casing set is 6⅝-inch. Grayburg Oil Co., three-quarters of a mile north of the discovery well is drilling at 4,015 feet, also nearly 400 feet below the producing sand in the discovery well. There was nothing particularly encouraging about the well. Magnolia Co., a quarter of a mile to the northwest at 3,187 feet was in its second sand carrying a little oil. It was only a streak of sand and not enough to make a well. Moody-Seagraves and William F. Morgan, at 3,619 feet, was having trouble in pulling the liner preparatory to drilling deeper and J. K. Hughes at about 3,800 feet was shut down. Hughes is a half-mile north of the discovery well. The five are the only tests drilling close enough to the discovery well to be considered as possible producers on the Piedras Pintas salt dome.

On the Palangan, a salt dome, a few miles to the northwest, Humble Co. is drilling at 3,416 feet in No. 4 Schallert and has moved in another rig and rigging up on No. 8 Singer in Section No. 4. Humble has drilled seven tests on the Singer within the past four years and is drilling the fourth test on the Schallert, all in the district of the Palangana salt dome. Previous tests have encountered the salt. No. 4 Schallert got off the dome and may be the reason why another rig is being moved in for another test on the Singer.

Simms Oil Co. drilling on the Schallert is down 1,800 feet on the north slope of the dome while the Humble Co. is drilling to the south slope.

Cole Field in Duval

In the Cole Field in Duval County Cin-Tex Petroleum Co. has completed No. 5 Benavides 450 feet from the northeast line and 150 feet from the northwest line of Block 16, Section 10. It is 400 feet nearly due north of the Cin-Tex No. 2 and it is estimated it will make gas and oil in about the same amount as No. 2 which has been putting about 500 bbls. of oil daily into the Magnolia's pipe line along with considerable gas. It is the fifth completion in the field to make oil in quantity since the Cin-Tex brought in its discovery well. It is 800 feet north and a little to the east of the discovery well. The same day Cole Petroleum Co. brought in No. 18 Benavides, 300 feet southwest of the Cin-Tex discovery well. It came in making gas and was shut in. It is believed that when opened again it may make oil as did Cole's No. 17. Humphreys-Moody-Seagraves, after resetting casing with a packer shut off the gas above in 61 feet of sand a mile to the northeast, tested again and the well came back as a big gas well spraying a trace of oil as it did before being worked over. It is estimated at 30,000,000 feet. Barkley & Meadows and William F. Morgan completed their No. 1 on Block 4 of Section 10, 150 feet from the southwest and southeast lines and a quarter of a mile northwest from the Humphreys-Moody-Seagraves test. It came in making gas, estimated at 50,000,000 feet. It topped the sand at 1,742 feet and drilled 32 feet into it without going through. The operators believe there is oil below but did not wish to take a chance on No. 1 and completed it as a gasser. They are rigging up No. 2 located in Block 4, Section 10 and 150 feet from the southeast and northeast lines and in this test will attempt to shut off the top of the sand and test the bottom in the belief they will get oil. Humphreys-Moody-Seagraves attempted to do that in their test.

Houston Oil Co.'s No. 2 Benavides, a 300-foot offset to the southeast of the Cin-Tex No. 2, has not been deepened as previously reported. The report that it had found a second sand was due to confusion with another well. It is the intention to pull the liner in No. 2 and drill deeper. No. 5 is being brought in. It is in Block 1 of Section 17 and is 650 feet southeast of Houston Oil Co.'s No. 1. It looked like an oil well. The Houston's No. 4 in Block 15 of Section 10, located 300 feet northeast of the Cin-Tex No. 3, is being retested. This far the Cin-Tex No. 3 has not made a producer.

Bexar County

The McClure well (Utah-Texas) on the Vick farm south of San Antonio 12 miles, is in the Georgetown and with a strong odor of oil. The well has proven a structure and has been the center of considerable interest since it reached the lower depth. It went out of the Del Rio somewhere around 2,700 feet. A core was attempted last Friday but the core barrel failed to close and the hole was being reamed down Saturday preparatory to making another attempt to take a core. With such a strong odor of oil in

(Continued on Page 196)

MARKED INCREASE IN DRILLING IN CANADIAN WESTERN PROVINCES

By Victor Lauriston
Staff Correspondent, Canadian Fields

CHATHAM, Ont., May 1.—In the Irma-Wainwright Field, east central Alberta, the Edmonton-Wainwright Oils, Ltd., No. 1, LSD 4, Section 29-45-6w4, has been drilled into the sand, with an estimated daily production of 150 bbls. or better at 2,275 feet depth. The oil stands at 600 feet in the hole. The Edmonton-Wainwright No. 1 offsets British Petroleums' No. 3-B, and production is from the same horizon reached by the latter at 2,260 feet.

Emerald Oils, Ltd., is moving in timbers for a derrick on LSD 8, Section 30-45-6w4; the location is about 600 yards north and slightly west of the British Petroleums' No. 3-B and Edmonton-Wainwright No. 1 and is believed to be higher on the structure. The test will likely spud in May 15. Officers of the company are, president, R. W. Jones, C. E.; vice president, H. S. Southgate; treasurer, John Kenwood; managing director, T. J. Sugars.

Further east on the Ribstone-Blackfoot anticline the Meridian Oil Co. has R. C. Callendar of Montana looking over its holdings and locating tentative sites. Five tests will be drilled this summer. Additional territory has been leased on the same structure by Fred C. Williams for Calgary interests.

In the northern foothills, 150 miles west of Edmonton, Imperial Oil, Ltd., has decided to abandon the No. 2 Coalspur, deep test well on LSD 110, Section 3-49-31w5. At 4,235 feet the drill was still working in the Benton formation. The Coalspur crew will be transferred to the Rice Creek well, 40 miles west of Nanton, in the southern foothills. This test, on Section 4-14-2w5, is down 4,025 feet with 8¼-inch casing set and will be drilled deeper.

West of Calgary

In the foothills west of Calgary, Imperial Oil, Ltd.'s Bow River No. 1, LSD 15, Section 12-25-5w5, in the Jumping Pound district, is down 1,700 feet and drilling in the Benton formation.

A continuation of the Turner Valley and Jumping Pound structures on the north bank of the Bow River will be tested by the Mount Royal Oil Co. J. P. Gerlough, geologist for the Potlach Oil Co. and E. F. Cobb of Montana are making a location for the Mount Royal west of Cochrane, on the old Mount Royal ranch property. The exact location is about the center of the SW of Section 36-26-5w5.

In the Turner Valley Field, Dalhousie Oil Co.'s No. 3, LSD 10, Section 13-20-3w5, has struck a show of light brown oil in what seems to be a stray sand in the bottom of the Kootenai formation, at 3,254 feet depth. The oil is about 54 Baume, and samples are being tested; and the well is shut down waiting for a swab which has been ordered from California. The oil stands about 600 feet in the hole. It comes from a fine brown sand which has not been met in any of the other Turner Valley tests; this sand is periodically forced up about 15 feet in the hole under what seems to be heavy pressure. The well is not regarded as a commercial producer, pending further testing; and it will probably be drilled deeper.

Dalhousie No. 1, LSD 4, Section 18-20-2w5, is still fishing for a lost bit at 3,256 feet. Dalhousie No. 5, LSD 16, Section 30-19-2w5, is building derrick and constructing camp for a new test.

Royalite Oil Co.'s No. 5, LSD 13, Sec-

(Continued on Page 178)

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BETTER BE SAFE THAN SORRY

Indiana-Illinois Is Fifth in Refining

Produced 13.4 Per Cent of the Country's Output of Gasoline Last Year and Has Maintained Average for Years

By Charles E. Bowles
Petroleum Analyst, The Oil and Gas Journal

Of the ten refining areas into which the Bureau of Mines has divided the entire country the Indiana-Illinois area ranked fifth, last year, in the production of gasoline. Its output was 1,461,000,000 gallons.

This was 13.4 per cent of the total output of the United States and, for years, this area has contributed almost exactly the same percentage of the output of the entire country. In 1924 it made 13.1 per cent of the total—in 1923 it made 13.4 per cent—and in 1918 it made 12.9 per cent.

While the seaboard refining areas handled large quantities of heavy crude containing little gasoline, the Indiana-Illinois area operates almost entirely on light crude with a high gasoline content and, based on the crude oil run to stills in 1925, recovered almost 52 per cent gasoline from "the average barrel."

Mostly Outside Crude

A relatively small proportion of the crude oil run to stills in the Indiana-Illinois area is produced within the area as the following tabulation shows:

Year—	Crude Produced	Crude run to stills
1918	20,963,000	32,154,000
1919	24,739,000	29,598,000
1920	22,586,000	41,528,000
1921	22,363,000	38,338,000
1922	21,483,000	45,606,000
1923	19,981,000	51,276,000
1924	18,451,000	56,399,000
1925	17,411,000	67,159,000

While its own local production has decreased about one-sixth in the last eight years—and its market trebled—the pipe line has been the "balancing factor" that could place any desired part of the enormous crude surplus of the Mid-Continent at its doorway. With raw material and markets assured, the refiners in this area have so nicely balanced the amount of crude run to stills as to produce, year after year, almost exactly the same percentage of the gasoline output of the entire country.

Differs From Oklahoma-Kansas

In the matter of the production of crude oil and of the runs of crude to stills, the Indiana-Illinois area and the Oklahoma-Kansas area occupy diametrically opposite positions, as the following tabulation shows. Amounts are for the year 1925 and in barrels.

Area—	Crude Produced	Crude run to stills
Oklahoma-Kansas	215,044,000	97,612,000
Indiana-Illinois	17,411,000	67,159,000

It is rather startling to note that while the Oklahoma-Kansas area produced 12 times as much crude as the Indiana-Illinois area it ran to stills only about 50 per cent more crude.

Marketing Territory

With a marketing area covering almost all of the upper half of the Mississippi Valley, by far the largest domestic market within any single refining area, and with great pipe line systems tapping the world's most prolific high gravity crude producing area with an abundant surplus, it is only natural that the refinery situation should have been worked out along the conservative, stable lines that are clearly reflected by the large graph.

In the 98 months shown on the graph, only once was the monthly production of fuel oil greater than of gasoline—during the other 97 months more gasoline than fuel oil was made. And for the last three years the space between the gasoline line and the fuel oil line has been gradually widening.

While gasoline recovery has been going up fuel oil recovery has remained almost constant—28.1 per cent in 1918 and 27.2 per cent in 1925. Under these conditions the recovery of the other two major products has decreased—kerosene from 15.3 per cent in 1918 to 8.8 per cent in 1925, and lubricating oil from 7.9 per cent in 1918 to 4.6 per cent in 1925, all of which is indicated on the "100 per cent graph" herewith.

Change in Operations

Some idea of the far-reaching changes that took place in refinery operations between 1918 and 1925 can be gotten from the following tabulation. All amounts in gallons:

Product—	Output 1918	Output 1925
Gasoline	461,000,000	1,462,000,000
Kerosene	137,000,000	258,000,000
Fuel oil	244,000,000	777,000,000
Lub oil	97,000,000	135,000,000

Thus the Indiana-Illinois refining area responded to its market by making three times as much gasoline in 1925 as in 1918—about twice as much fuel oil—about 40 per cent more kerosene—and about 40 per cent more lubricating oil. And it is obvious that in the upper half of the Mississippi Valley, served almost entirely by the Indiana-Illinois refining area, the pendulum has swung very sharply in the direction of gasoline as the outstanding product from crude oil.

In the Oklahoma-Kansas, inland Texas, Texas Gulf Coast, Louisiana Gulf Coast and California refining areas fuel oil in storage got quite far out of line at different times during recent years. In the matter of fuel oil stocks Oklahoma-Kansas—an "inland" area—was affected about as much, in proportion, as the "seaboard" areas.

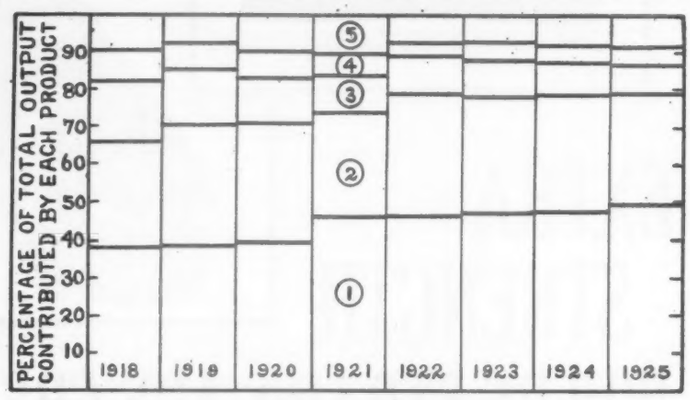
Both the Oklahoma-Kansas and the Indiana-Illinois areas are refiners of high gravity oil. But in the Indiana-Illinois area, the monthly production of fuel oil and the stocks at the end of the month have not been out of line in the last eight years— and during the last three and one-half years there has been only one month (June, 1923) when the stocks of fuel oil at the end of the month was greater than the month's production. During the last three and one-half years the refineries in the Indiana-Illinois area have carried an average of about three weeks' output of fuel oil.

Storage and Consumption

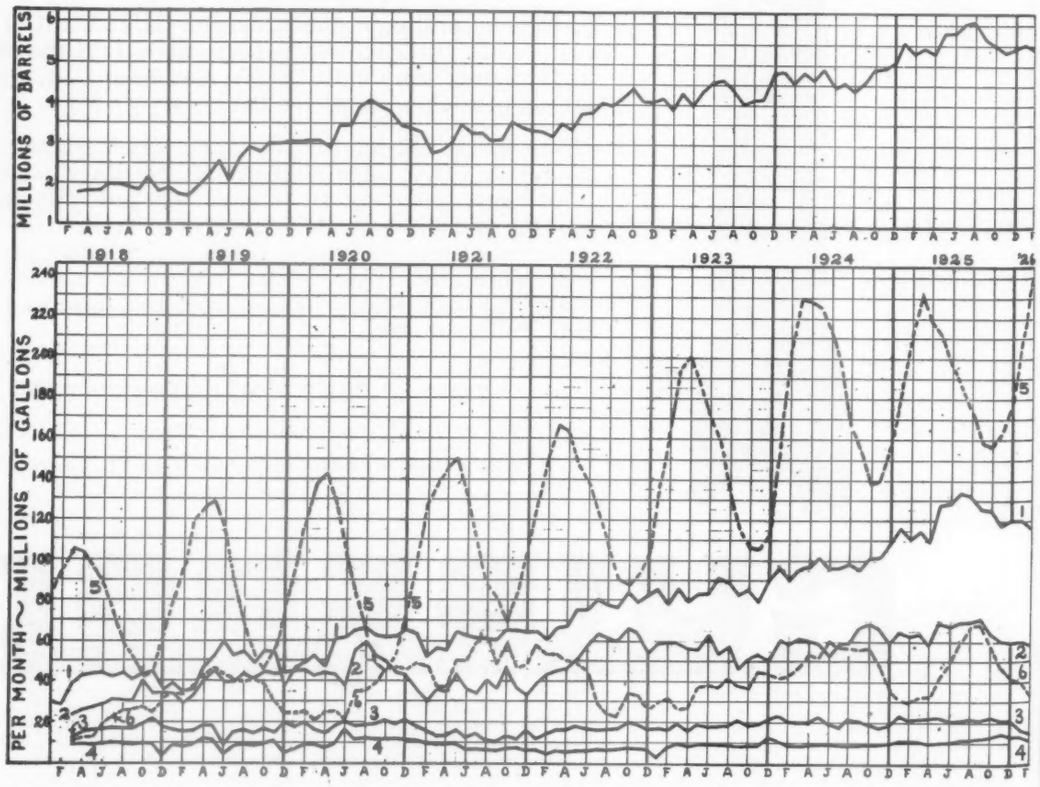
The gasoline storage line is easily the outstanding feature of the large graph. Obviously the refiners in this area know so definitely the gasoline-absorbing capacity of their markets that they have been able to hold the relation between the gasoline production line and the gasoline storage line in almost exactly the same relationship for the past eight years. The amazing thing is that not once in this time has the gasoline storage line halted where it started either up or down. In no other area has the gasoline storage line, over a period of years, shown a "uniformity" at all comparable with the Indiana-Illinois area.

For eight years the low point in this area's gasoline storage has been either October or November—and the high point has been either March, April or May. In 1923 the "range" between high and low stocks was about 95,000,000 gallons—in 1924 about 90,000,000 gallons—in 1925 about 75,000,000 gallons—and from 1918 to 1922 it averaged about 80,000,000 gallons. The full force of the causes

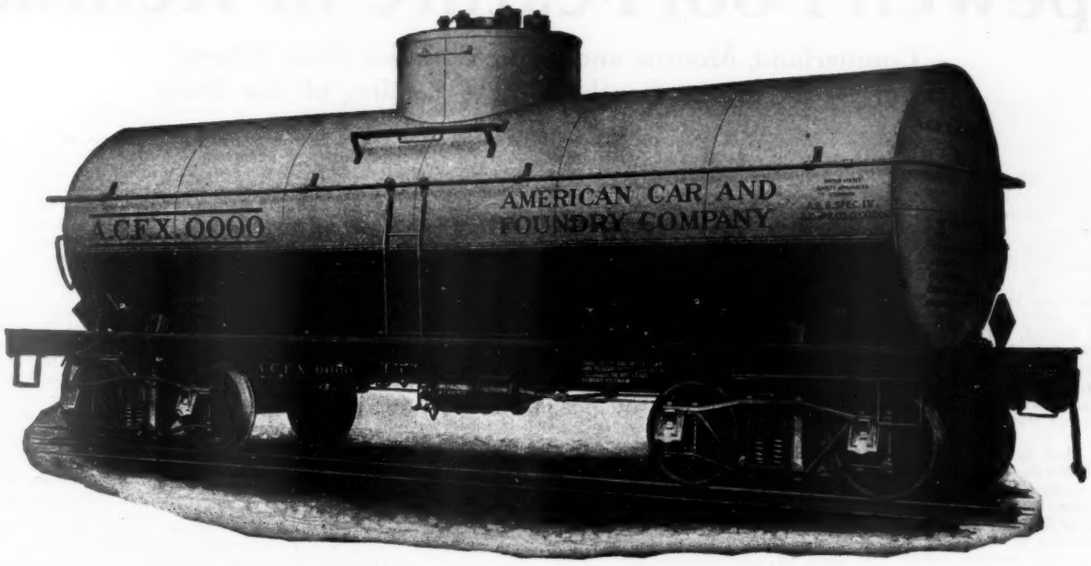
(Continued on Page 169)



Indiana-Illinois refining area. Space 1, gasoline recovery—Space 2, fuel oil recovery—Space 3, kerosene recovery—Space 4, lubricating oil recovery—Space 5, all other products. Recoveries based on net runs to stills. Data from reports of United States Bureau of Mines



Indiana-Illinois refining area. Upper section—crude oil run to stills. Lower section—Line 1, gasoline made—Line 2, fuel oil made Line 3, kerosene made—Line 4, lubricating oil made—Line 5, gasoline in storage at refineries—Line 6, fuel oil in storage at refineries. Based on Reports of United States Bureau of Mines.



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"Car Foundry" TANK CARS

Hopewell Pool Feature in Kentucky

Cumberland, Monroe and Adair Counties Most Interesting Areas in the South Central Section of the State

GLASGOW, Ky., May 3.—A survey of the Kentucky Field shows there are 178 rigs on locations. The west end is in the lead with 6 rigs and 107 drilling wells, while in the eastern division 65 wells are either drilling or getting ready to start. Barren County, as usual, is the most active county in the State with 29 drilling wells and rigs and the Cumberland-Monroe territory is second with a total of 26 wells under way, followed by the Owensboro district, with 22 wells in the making. Warren County has 14 under way; Lawrence-Johnson Counties, 13 drilling and rigs while Johnson-Magoffin have a total of 11. Other counties over the State run from 1 to 9 drilling wells.

The Tennessee Field is credited with 12 wells drilling; Mississippi with 11; Alabama, 5, and Georgia 4, making the grand total for these fields of 210 rigs and drilling wells, or 22 more than were running at the opening of April, which is a nice increase, with weather conditions as they have been for many weeks. It looks now as though the operator was making ready for an active drilling campaign.

Interesting Wildcats

Quite a few interesting wildcat wells are now under way in various sections of Kentucky. Two of the most important in the western division are in the almost extreme northwestern part of Warren County, in the vicinity of the small hamlet of Benlow. Just south of Benlow, the Petroleum Exploration Co. is going along in good shape with the test on the N. L. Miller farm, while directly west some over a mile, F. F. Blanchard and others are working on the C. H. Daugherty farm. In Barren County, the Lecta Pool, 3 miles east of Glasgow, attracted much attention when the Esslinger Oil Co. brought in the discovery well on the C. B. Jones farm, with a flush better than 100 bbls., but with several wells drilled at least three dry holes close to producers have been brought in. Regardless of this the operators keep work going to test out other areas. Along the Tompkinsville road leading out of Glasgow to the southeast is another development in the Matthews vicinity; the wells are only normal producers, but as large as the general average of the other pools in the county. In the Owensboro district of Hancock, Ohio and Daviess Counties, numerous tests are being drilled in hopes of extending the present pools, or opening up new ones. The Midkiff and Swope pools have been a forerunner for extensive development and will bring about much wildcatting, even across the line in Henderson County, and other counties along the Ohio River both east and west of Owensboro.

One area that is to get a real testing out is Cumberland-Monroe and Adair Counties, especially the territory along the Cumberland-Adair line where some big producers have been found of recent date. The wells in this area, known as the New Hopewell Pool, make it appear to be similar to that found a few months ago in Clay County, Tennessee, in what is now known as the Clark Pool. Rich producers have been developed in both pools and operators are not going to overlook anything as productive as these two pools have proven to be.

Casey County, which for the past several years has been looked upon as probable producing territory, is now in the limelight again and this time will get at least a few tests. Eight years ago nearly the entire Casey County was under lease, but leaseowners were backward and practically nothing was done. Now comes the report that Col. Less Combest, one of the pioneers of Kentucky oil, has secured a large acreage near Avono, on South Fork Creek, and is starting a purely wildcat test on the structure known on the T. B. Hammonde land. Near Dunville, in the same county and in the Goose Creek section, Ben Russell, of Kansas City and Texas points, is starting a test. Several other tests are in the making.

The Idamay area of Lee and Owsley Counties is to get its quota of test work, as are parts of Wolfe, Powell, Estill and the northeastern counties of the State along the Ohio and Big Sandy rivers. In Floyd County, the large gas operating concerns are giving the territory a good testing out. Knox County is another in line for testing as is most every county in the State.

Week's Work

During the week a total of 19 completions were reported in the Kentucky Field, 15 being oil wells with a flush of 80 bbls., and 4 dry holes. This is a decrease from the previous week's figures of 5 completed wells, a decrease of 2 oil wells, 26 bbls. less production, 2 less dry holes and 1 less gas well. These wells were distributed among the various counties as follows:

County—	Comp.	Prod. Wells	Prod.	Dry	Gas
Lawrence-Johnson	4	4	24	0	0
Owensboro Dis.	3	2	20	1	0
Allen	3	3	13	0	0
Barren	3	2	7	1	0
Estill	2	2	10	0	0
Johnson-Magoffin	2	2	6	0	0
Warren	1	0	0	1	0
Wayne	1	0	0	1	0
Total	19	15	80	4	0
Last week	24	17	106	6	1
Difference	5	2	26	2	1

Western Division

New work is springing up in parts of the western division as the roads are drying up so material can be hauled over them. A couple of wells a little in advance of production are now under way in Simpson County and up in Henderson County along the Ohio River east of the Owensboro district, some new work is being started. This county lies up well with other north Kentucky fields and is expected to show some worthwhile territory.

Owensboro District

One of the lively spots in the Owensboro district, is the Swope Pool, where the good producers on the Guenther-Gant, Powers, Ellis and other adjoining leases have been found. Much new work will start now that conditions of the roads have improved to some extent. It is one of the rich spots with two known pay sands, the Jett and Barlow, and with showings in a more shallow sand known as the Jackson sand.

Only three completions were reported from the Owensboro area for the week and all were in the Swope Pool, but they were rather light compared to what was found on the Guenther-Gant lease. The Wah-Shah-She Oil Co.'s second well on the R. B. Powers 86 acres, and 400 feet south of No. 1, proved a duster in both the Jett and Barlow sands. The Pennsylvania-Indiana Oil Syndicate's No. 4, on the R. B. Powers 106 acres, offsetting No. 1 on the R. B. Powers 86 acres, is reported at 10 bbls. from the Barlow sand, while No. 5, same lease, is also a 10-bbl. producer according to reports.

In the Swope Pool, the Penn-Indiana Oil Syndicate is reported to have drilled in its No. 3 on the Laura Mercer, 400 feet north of No. 2 and it will show around 20 bbls. from the Barlow sand and may develop into a much more prolific well when putting oil into the tanks. Daugherty & Co.'s No. 10 on the Widow Crowe lease and 200 feet north of No. 2 on the Laura Mercer lease, is showing for a nice producer in the Barlow sand, equal to any of the wells in its locality.

Cornell & Weatherholt are in the sand with No. 1 in the northeast corner of the Askins tract and an average producer is expected as a number of fair producers are in that locality.

The Chicago Petroleum Co. struck a nice flow of oil in the Jett sand in its No. 4 on the Guenther-Gant lease and just east of the well of H. M. Loman, trustee, on the J. R. Ellis lease, but the Jett sand has been cased off, and drilling will continue to the Barlow sand in the hope of getting a better flow, and thus make a combination well. If this fails, the company has the Jett sand to fall back on. This is the third producer for this lease, the first completion being a duster.

H. M. Loman, trustee, has started a second well on the Joe Bob Ellis lease, where a fine producer was brought in some 10 days ago. This lease adjoins the Guenther-Gant tract.

The Leeper Oil Co. has No. 1 on the Monroe Colyer lease, in the Pellville area, down close to pay sand and expects a producer of value. This adjoins the J. S. Coyler lease, on which there are several good producers.

Chicago Petroleum Syndicate is down close to 500 feet in its No. 1 on the Mrs. Nannie Bunn farm, north of the Ellis tract, in the Swope Pool. The Penn-Indiana Oil Syndicate is drilling No. 13 on the Swope Brothers 111 acres, offsetting Dougherty and others' No. 9 on the Widow Crowe 153 acres. White Plains Oil & Gas Co. is drilling No. 3 J. J. Midkiff lease, in the Midkiff Pool.

The Creek Oil Co. is drilling another well for the Ohio Oil Co. in Breckenridge County. Several dusters have been found in that locality, but the leaseowners are confident there is oil in that locality, and will continue explorations.

Cumberland-Monroe-Adair

Just at present the Cumberland-Monroe-Adair Counties are in the oil limelight of Kentucky and bid fair to see one of the heaviest plays in the history of the southern central portion of Kentucky. The New Hopewell Pool along the division line of Cumberland and Adair Counties is attracting widespread attention of oil men and much has been done in the way of securing leases, along and adjacent to Crocus Creek.

No. 3 well on the J. Grider farm is one that caused no end of commotion by its gusher flow which caught fire and destroyed the rig. It has not been flowing since the fire was extinguished and the well is now shut down until the contractor can get another rig on the lease. They have purchased one new machine and also a second-hand one. These rigs will be on the lease in a few days. Phillippi and others are starting a well on the Patterson farm, an offset to No. 2, on the J. Grider, owned by Baird & Hickman.

J. R. Crawford and L. B. Webster of Shreveport, La., have inspected the New Hopewell Pool, on Crocus Creek and have purchased considerable acreage and let a contract for five tests, the first to be drilled on a 160-acre lease on the Hiram Johnson farm. This location is at the north end of the Hopewell structure, and some 4½ miles northeast of the big wells on the Fulton Grider farm, especially No. 3, where the well flowed for 12 hours, running wild and the oil burning. Baird & Hickman inspected their new well on the Grider and expressed themselves as being well pleased with results so far obtained in that section of Kentucky. J. T. Leech, of Cameron, Tex., has also inspected the section in

(Continued on Page 134)

TWO GOOD COMPLETIONS REPORTED IN FRIENDSVILLE DISTRICT, ILLINOIS

By Whit

Staff Correspondent, Central West Fields

FINDLAY, Ohio, May 3.—In the division of the Central West Field north of the Ohio River during the week there were a total of 36 wells reported finished with a flush of 218 bbls., 14 dry holes, 7 gas wells and there were 29 old producing wells that were abandoned. There is a slight improvement in weather conditions and a noticeable increase in development work which will improve right along as the weather gets better.

The old Lima Field of northwestern Ohio still maintains its usual activity and can always be figured upon to show a few completions. Wildcatters are making ready for the start of the season's work and something worth while will no doubt be found to add to the already large field. The old field with an area close to 200 miles long, and from 1 to 75 miles wide, still has an abundance of undrilled locations within defined limits to say nothing of the prospects of adding many more miles in all directions. There is hardly a break in the big field which runs in a northeast and southwest direction, the eastern terminus being the wells on Catawba Island near Port Clinton in Ottawa County and the western area being the state line of Indiana near Fort Recovery, although the Trenton Field extends over a great many miles into Indiana. Both states are destined to have a revival of work in all producing counties the coming summer. With the addition to the north of the old field, which is in Paulding County and parts of Mercer County, while to the south are Duke, Hardin, Shelby with possibilities of other counties falling into line within a few months.

Lima Field Work

The best completions reported for the week in the old Lima Field was made by Charles Geselchen and others in No. 4 in the southeast corner of the William Lenney farm, in the northwest quarter of Section 12, Bath Township, Allen County, with a flush of 40 bbls. Top of Trenton was struck at 1,311 feet and drilled 54 feet in. No. 5, same farm, is drilling. In Spencer Township, same county, the Briggs Oil Co. is drilling No. 1 on the Elmer Wilkins, Section 13, while Boyd & Stelzer are drilling No. 1 on the Louise Mouser, Section 34.

Near North Baltimore, in Henry Township, Wood County, the Trail Oil Co.'s No. 5 well, 600 feet from the north and east lines of the John Carhill, Section 24, pumped 2 bbls. with sand topped at 1,135 feet and drilled 250 feet in the sand. The Ohio Oil Co. is drilling No. 32 on the M. Auverter, Section 11, same township. In Liberty Township, the Queen Oil Co.'s second test, 215 feet from the north line and 1,300 feet from the west line of the George Bordner, in the NW of Section 4, pumped 3 bbls. at a total depth of 1,347 feet or 105 feet in the sand. The Ohio Oil Co. pulled out and abandoned old No. 13 on the Jonas E. Parmenter, Section 2, same township, and near Portage. In Portage Township, William and M. Aurand have abandoned their

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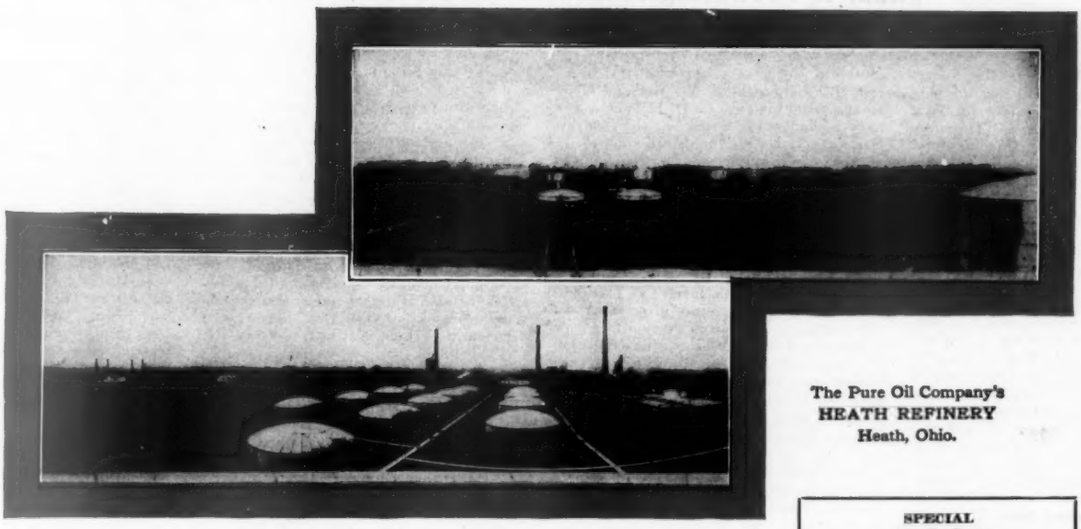

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Good Producers in Holmes County, O.

Big Injun Pool, Henry District, Clay County, West Virginia, Is Producing Almost Thousand Barrels Per Day

By D. S. Wakenight
Staff Correspondent, Eastern Fields

PITTSBURGH, Pa., May 3.—Nearly all of the wells completed during the past week came in light producers. The deep sand territory in southeastern Ohio had but a few and West Virginia and southwest Pennsylvania completions were generally light. The month's operations, as the monthly statistics will show, proved disparaging compared with the preceding month. More wells will have been completed and the new production considerably less. As usual for this time of the year there is an increased amount of new work starting, but is confined to no particular district. With the exception of one section, Henry district, Clay County, West Virginia, the work is nearly all located in the old districts and widely distributed.

Southeastern Ohio

The Empire Gas & Fuel Co.'s test on the Delpha Metherow farm, in Lot 10, Hardy Township, Holmes County, produced 135 bbls. the first 18 hours after shot in the Clinton sand.

In the Fisher Pool, Section 28, Alexander Township, Athens County, Egan & Co. have completed a test on the John W. Lax farm. It is a duster in the Berea grit. In Section 20, same Township, the Brooks Oil & Gas Co. has a duster in the Berea grit at a test on the Dusker Russ farm in Lot 74, Athens Township, L. T. Bickel & Son have a very light pumper in the same formation at No. 4 on the G. C. Lawson farm. The Gross & Frebault Co. is due in the sand on the Daniel Higgins farm and the Ohio Oil & Gas Co. is due in the sand at No. 4 on the Clinton Atkinson farm.

In Sutton Township, Meigs County, Simon Lebow & Co. have a 10-bbl. pumper in the Berea grit at No. 3 on the Charles & Frances Holter farm. P. L. Clifton & Co.'s second test on the Ernest McBride farm is good for 4 bbls. a day in the same formation.

Another good well in Holmes is the Empire Gas & Fuel Co.'s second test on the Jesse F. Close farm, in Lot 5, Hardy Township. It produced 110 bbls. the first 24 hours after shot in the Clinton sand. In the northeast quarter of Section 4, Ward Township, Hocking County, the Sunday Creek Coal Co. got in the same formation a 25-bbl. producer at No. 135 on the Sunday Creek Coal Co.'s property.

The wells completed in the shallow sand territory came in light pumpers or dry holes. Operators in Athens County are still active but the average size of the wells is small. Holmes County still retains the lead in the deep territory. When conditions are favorable this county will furnish more new production than any other.

In the northwest quarter of Section 10, Jackson Township, Noble County, Levi Hail and others have completed in the Macksburg 800-foot sand No. 3 on the Charles Misel farm, good for less than 2 bbls. a day. In the center of Section 14, same township and county, Clyde Hutcheson & Co.'s second test on the A. and E. Wagner farm is not much better than a dry hole in the same formation.

Light Gasser in Holmes County

In the southwest quarter of Section 9, Prairie Township, Holmes County, the Empire Gas & Fuel Co. drilled its second test on the William H. Miller farm through the Clinton sand. No oil was developed and only a light gas pressure. In Enoch Township, Noble County, H. H. Mosely & Co. have a duster in the Berea grit at No. 5 on the L. W. Morland farm. In the same district, C. D. Harper & Co. have a rig up for a test on the Andrew Hill farm. In Sharon Township, P. L. Hanlon & Co. have a duster in the 700-foot sand at a second test on the John and Nathan Cisler farm.

Week-End Completions

In the Fisher Pool, Alexander Township, Athens County, the Ohio Oil & Gas Co. completed in the Berea grit No. 4 on the Clinton Atkinson farm. It produced 15 bbls. the first 24 hours after shot. In the southeast quarter of Section 33, York Township, Morgan County, the Daily Oil Co. has completed in the Berea grit a second test on the Mary L. Bell farm good for 5 bbls. a day.

In Section 29, Alexander Township, Athens County, the Biddle Oil & Gas Co.'s No. 6 on the Frank Biddle farm produced 20 bbls. the first 24 hours after shot in the Berea grit. In the old Corning Field, Section 33, Pleasant Township, Perry County, the Allegheny Oil Co.'s No. 11 on the Elizabeth Borrisford farm is a light pumper in the same formation. In Section 34, Alexander Township, Athens County, J. H. Harmon is starting a test on the John Sax 60 acres.

On the west side of Section 36, Newport Township, Washington County, G. W. Kesselring has completed No. 19 on the A. B. Little farm, good for 5 bbls. a day in the Keener sand. In Section 8, Green Township, Monroe County, David Crawford & Co. completed a test on the Elizabeth Jeffers farm dry in all sands.

In Falls Township, Hocking County, the Schneider Oil Co.'s test on the Jacob Schneider farm is good for 6 bbls. a day. In Section 17, Prairie Township, Holmes County, the East Ohio Gas Co.'s No. 4 on the L. A. Sowash farm is good for 20 or 25 bbls. a day in the Clinton sand. In Newton Township, Licking County, E. J. Edmonds & Co. have a 5-bbl. pumper in the Berea grit at No. 7 on the Ellen E. Forry farm. The East Ohio Gas Co.'s second test on the John Conkle farm in Clark Township, Coshocton County, is dry in the Clinton sand.

In Section 30, York Township, Morgan County, the Swingle Oil & Gas Co.'s test on the D. P. Stoneburner farm is a gasser in the Berea grit. In Section 13, Brown Township, Knox County, the East Ohio Producing & Refining Co. has a 2-bbl. pumper at No. 16 on the H. S. Snively farm. In Enoch Township, Noble County, Albert P. Scheetz has a very light pumper in the Buell Run sand at No. 9 on the Theodore Boyd farm.

Duster in Licking County

In the northeast quarter of Section 10, Bowling Green Township, Licking County, the Midland Oil Co. has drilled a second test on the A. D. Cooperrider farm through the Clinton sand dry. In Section 10, Hopewell Township, Soules & Co. are spudding in a test on the William Coomes farm. In Lot 16, Hanover Township, the Hope Construction & Refining Co. is drilling a test on the Susan A. Miner farm to the Clinton sand. In Lot 14, Franklin Township, the Detex Oil & Gas Co. is drilling for production in the Berea grit at No. 4 on the Albert Gutridge farm.

West Virginia

The completions of the week in the West Virginia fields were uniformly light pumpers. In the list of completions there were many gas wells. Development work in the Big Injun sand development in Henry district, Clay County, is increasing as well as the production. At this time there are 25 rigs up and wells drilling. The production of the pool has been increasing and is now close to 1,000 bbls. a day.

The prospects for new production in the salt sand pool in Scott district, Putnam County, are more promising than since last year. During the past 30 days the new production from this source has amounted to a little more than 100 bbls. It is not expensive territory to operate on account of the salt sand being one of the most shallow producing formations.

In Elk district, Harrison County, the Grasselli Chemical Co. has drilled a test on the J. M. Wilkison farm through the fourth sand and very light. In Union district, the Hope Natural Gas Co. had the same luck when it drilled a test on the J. W. Sommerville farm through the Speechley sand. In Center district, Wetzel County, the Carnegie Natural Gas Co. has drilled deeper its second test on the F. M. Wade farm, good for 5 bbls. a day.

In Smithfield district, Roane County, Godfrey L. Cabot has completed and shot a test on the C. H. Butcher farm. It is a gasser. In Liberty district, Marshall County, the Hope Construction & Refining Co. has an 8-bbl. pumper in the Gordon sand at a test on the D. A. Fair farm. In Clay district, Monongalia County, the Red Fox Oil Co. drilled deeper its old No. 2 and has a very light pumper in the Bayard sand.

Ritchie County

On the waters of Plum Run, Murphy district, Ritchie County, F. H. Davis and others completed a test on the A. W. Flesher farm. It is a gasser in the Big Injun sand. In the same district, S. A. Powell & Co.'s second test on the Kennedy heirs farm. It is a gasser in the same formation.

In the Big Run Pool, Williams district, Wood County, Reed, Athey and the Grant Oil Co. drilled through the first Cow Run sand No. 3 on the George Henry farm. It is a duster. On Laurel Creek, Union district, the South Penn Oil Co. has the rig completed for No. 4 on the Daniel Wharton farm.

In Washington district, Calhoun County, the Norris & Cain Oil Co. has a salt sand gasser good for 50,000 feet at No. 5 on the N. Jarvis farm. In Sherman district, the Chemical Oil Co. has a rig completed on the R. L. Richards farm. In Union district, Tyler County, D. E. Sanders' test on the N. A. Hays 30 acres is a dry hole.

On Meadow Run of Goose Creek, Grant district, Ritchie County, the Big Four Drilling Co. has completed a test on the J. M. Dawson farm. It is good for 12 bbls. a day in the Big Injun sand. On Wagners Run, Murphy district, the Hope Natural Gas Co. has a Big Injun sand gasser at a test on the William Martin farm.

In Sherman district, Calhoun County, the Hope Natural Gas Co. has now completed its test on the Okey Parsons farm in the salt sand. It is a natural producer good for 20 bbls. a day. In Lee district, the Hope Construction & Refining Co. has a gasser in the Big Injun sand at a test on the C. E. Offett farm. In Curtis district, Roane County, the Ohio Fuel Oil Co. has an 8-bbl. pumper in the Cow Run sand at a test on the C. C. Watson farm.

Wood County

In Williams district, Wood County, the Routh Oil Co.'s No. 3 on the Louise Uhl farm is a very light pumper. In Central district, Doddridge County, the Hope Construction & Refining Co. has a 15-bbl. pumper in the Big Injun sand at No. 3 on the Lucinda Williams farm. In Liberty district, Marshall County, W. A. Evans & Co.'s test on the W. E. Parriott farm is dry in all sands. In Center district, Wetzel County, the Carnegie Natural Gas Co.'s second test on the F. M. Wade farm is good for 5 bbls. a day in the Gordon sand.

In Grant district, Cabell County, Burns, Lockwood & Sweetland completed in the Berea grit a test on the Garnet Morrison farm. It is a gasser. In West Union district, Doddridge County, West Hope Construction & Refining Co. has a light pumper in the Gordon sand at a test on the Catherine McCauley farm.

In Murphy district, Ritchie County, the Cain Run Oil & Gas Co.'s No. 35 on the Prunty heirs farm is through the Big Injun sand and dry. In the same district, the Carnegie Natural Gas Co. has the rig completed for another test on the E. L. Britton farm. In DeKalb district, Gilmer County, the Philadelphia Oil Co. has the rig completed for No. 3 on the D. Stalnaker farm.

On Ices Run, Fairmont district, Marion County, the Pleasant Oil & Gas Co. has drilled its test on the James M. Fleming farm through all sands and dry. This well was drilled to a total depth of 2,801 feet.

Light Pumper in Mason County

One and one-half miles east of the Ohio River, in Graham district, Mason County, Covey and others have drilled a test, somewhat of a wildcat, on the Elmer McMillan farm through the Berea grit and showing for a 4-bbl. pumper. This location is far removed from any previous production.

In Lee district, Mingo County, the Pure Oil Co.'s test on the Cotigo Development Co.'s property is dry in the Berea grit. In Cook district, Boone County, the Owens Bottle & Machine Co. has a light gasser at No. 3 on the Pond Fork Coal Co.'s property. In Peytonia district, the same company's No. 26 on the Coal River Mining Co.'s tract is a small gasser.

Gassers in Cabell County

In McComas district, the Commercial Gas Co.'s test on the C. A. Morrison farm is a gasser in the Berea grit. In Grant district, the Aetna Oil & Gas Co.'s test on the J. C. Chapman farm and the same company's second test on the John Davidson farm are both gassers in the Berea grit.

In Grant district, Ritchie County, the Big Four Drilling Co.'s test on the Viola Dawson farm is not good for more than 2 bbls. a day in the Big Injun sand. In the same district, L. N. Rinehart & Co.'s test on the Daniel Mitchell farm is producing 20 bbls. a day from the Big Injun sand. In the same district, the Penn Royal Oil Co.'s No. 5 on the Lowther Brothers farm is good for 300 bbls. a day in the Big Injun sand. The Mellon Oil Co.'s second test on the Curtis Mitchell farm is a light pumper in the same formation. In Murphy district, Captain Davis & Co. have a gasser in the Big Injun sand at a test on the Leonard Donley farm.

Gilmer County

In Center district, Gilmer County, the Hope Natural Gas Co. has a gasser in the Berea grit at a test on the S. C. Moore farm. In DeKalb district, the Hope Construction & Refining Co. has drilled down to the Big Injun sand old No. 1 on the Drusilla Hardman farm. It is a gasser in the Big Injun sand. In Sherman district, Calhoun County, the same company's test on the Okey Parsons farm is good for 5 bbls. a day in the salt sand. In Sheridan district, Crawley Brothers have a gasser in the Big Injun sand at No. 3 on the W. P. Seals farm. On Hughes River, Murphy district, Ritchie County, the Cain Run Oil & Gas Co.'s No. 35 on the Prunty heirs farm, com-

(Continued on Page 166)

Actual photograph, Complete unit leaving Smith plant October 25, 1925

From Raw Steel to Finished Still— Only the Best Meets the Smith Standard

BACK of every Smithsteel Pressure Vessel is the unceasing care and inspection that guards every step of the manufacturing process. Special analysis steel is formed by exclusive Smith processes into Cracking Stills of unusual safety and high operating efficiency.

Due to the unlimited specifications to which Smithsteel Stills can be made, full advantage may be taken of the most efficient refining processes.

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A consultation with Smith engineers will convince you of the superiority of Smithsteel Cracking Stills.

A. O. SMITH CORPORATION · *Milwaukee, Wisconsin*
TULSA · LOS ANGELES

CRACKING STILLS

MEN KNOWN IN OILDOM

William K. Warren

William Kelly Warren, president of the Warren Petroleum Company, was born in Nashville, Tenn., December 3, 1896.

While still in his "teens," Mr. Warren decided to come West as he had heard so many glowing accounts of the oil fields, and the future it held for young men appealed to him. At that time Tulsa was a rapidly growing city with a population of 25,000 and the center of the Mid-Continent Field. In February, 1916, Mr. Warren moved to Tulsa.

With the idea of learning all phases of the oil industry, he worked both in the fields and in oil company offices for the next six years, being employed by the Gypsy, Gilliland and McMan Oil Companies in turn.

In September, 1921, Mr. Warren was married to Miss Natalie Overall of Nashville, Tenn.

Early in 1922, Mr. Warren organized the Warren Petroleum Company. Its growth has been phenomenal and it now controls the output of 31 gasoline plants in Oklahoma, Kansas, Arkansas, Louisiana and Texas. Associated with Mr. Warren are Charles E. Brown and Joseph A. LaFortune, vice president and secretary, respectively, of the company.

PERSONAL PARAGRAPHS

Clyde Fowler of Bartlesville, Okla., is making a tour of the north Texas fields.

* * *

Joe P. Cappeau, Sr., of Pittsburgh, Pa., is spending some time at Fort Worth, Tex.

* * *

Kemp Kimberlin, an oil operator of San Angelo, Texas, made a trip to Fort Worth recently.

* * *

George A. Simon, oil operator of Okmulgee, Okla., is in San Angelo, Tex., looking over the field.

* * *

A. M. Deussen of the Marland Oil Company of Texas, has returned to Houston, Tex., after a trip to the north Texas fields.

* * *

A. S. Nelson of Wichita Falls, Tex., has been in San Antonio, Tex., and is planning to open an office there. He is an independent operator.

* * *

O. G. Wilson, Jr., assistant chemist of the Gulf Refining Company, was in Los Angeles, Calif., recently in the interests of his company.

* * *

Dorsey Hager, geologist, of Seattle and Great Falls, Wash., has been in Alberta recently looking over the oil situation for American interests.

John W. Anderson has been appointed coastal representative of the Ross-Meehan Foundries, Chattanooga, Tenn., which handles various castings.

* * *

Joe V. McGinity, representing the Wilson Oil Tools Corporation of Los Angeles, Calif., is touring the Louisiana and Arkansas fields in the interest of his company.

* * *

Felix A. Vogel, geologist, who has been in California for some months, is now at his office in San Antonio and is doing some work in the southwest Texas district.

* * *

W. L. Todd, vice president of the Simms Oil Company, with headquarters in Houston, spent a few days in Shreveport, La., last week in the interest of his company.

* * *

Harry B. Burlow, manager of oil country sales for Templeton, Kenly & Company, Chicago, manufacturers of Simplex jacks, was in Tulsa recently on a tour of the Mid-Continent fields.

* * *

Commander H. A. Stuart of the Navy Department spent the past week in Casper, Wyo., looking after the business of Teapot Dome. Commander Stuart is one of the receivers of Teapot Dome.

* * *

J. O. Williams of Edmonton, Alta., has resigned the secretaryship of the Central Alberta Oil Association to act as field manager for a number of companies operating in the Wainwright Field.

* * *

W. A. Capron of the Sinclair Crude Oil Purchasing Company's executive offices at Tulsa made a trip through the north Texas fields accompanied by Frank Hadley, chief engineer of the company.

* * *

Former Tulsans whose faces may now be seen in the lobby of the Texas Hotel at Fort Worth include Walter Nelson, Cyril Nelson, Walter Duffy, "Tampico" Larsen, Chauncey Olcott and Gerry Park.

* * *

N. G. Penrose has been in San Antonio, Tex., registered at the St. Anthony and attending the Fiesta San Jacinto, the annual spring festival of San Antonio. Mr. Penrose is an oil man from Tampico, Mex.

* * *

Charles A. Colby, superintendent of the California Petroleum Corporation's properties in the Coalinga district, has just been elected a member of the California Oil & Gas Commission, succeeding B. L. Culver.

* * *

Frank Henderson of New York City, who was active in the development of the Bartlesville, Okla., Field years ago, has completed a trip through the Texas and Louisiana fields and inspected his gasoline properties.

* * *

Hal Peck is down from Corsicana visiting friends in the coastal fields. He is connected with the Lincoln Tank Company. Mr. Peck is recuperating from a severe illness, which pulled him down from 260 to 170 pounds.

* * *

W. H. Geis, geologist for the Consolidated Royalty Oil Company, has left for California where he will make a location for a second well. The first location was drilled and brought in a good producer for his company.

* * *

Fred McManis, president of the W-K-M Company, Houston, Tex., is in Tulsa. The company will exhibit its pipe cleaning machine at the annual exhibition of the Natural Gas Supply Men there May 17, 18, 19 and 20.

* * *

J. C. Colligan, general superintendent of the northern division of the Texas Pipe Line Company with Dallas headquarters, visited the general offices in Houston during the week. Mr. Colligan started in the pipe line end of the industry back in the Washington, Pa., Field.

* * *

Col. A. E. Humphreys came down to Houston, Tex., from his Denver, Colo., home to confer with Julius Fohs, consulting geologist. The Humphreys Corporation is drilling at Sour Lake and wildcatting in Northeast Texas. It has also accumulated considerable acreage in the coastal belt which will be tested.

E. Roberts, auditor and efficiency man, at one time with the Texas Production Company, is now associated in the same capacity with George M. Ball, who is operating in south Texas with offices at San Antonio, Tex.

* * *

J. C. Wadsworth has been appointed coastal representative of the General Oil Tool Company, Houston, Tex. The company specializes on the Kammerdine rotary jar and the Jones outside cutter. Mr. Wadsworth is well known in the Gulf Coast region as a driller and contractor.

* * *

Jack Danciger of Danciger Brothers has been in San Antonio and through South Texas and it is understood may remain there for some time. Danciger Brothers are not drilling in South Texas at this time but have in the past, having developed and later sold some production at Luling. Mr. Danciger is now in South Texas with a view to possible wildcatting.

* * *

Herbert L. Pratt, president of the Standard Oil Company of New York, is taking an active interest in raising funds for the maintenance of the Playground and Recreation Association of America. In addition to having made a generous subscription himself, he has taken the responsibility for obtaining from New York City its part of the association's national budget for 1926.

* * *

Arthur J. Smith, who has been manager of refining operations for the Paragon Refining Company of Toledo, Ohio, left April 1 to become manager of the White Star Refining Company in Wood River, Ill. The Paragon baseball club served a dinner to Mr. Smith in the new Fort Meigs Hotel where the members presented to him a 21-jewel watch appropriately engraved.

* * *

Ralph Arnold, who is chairman of the Republican County Central Committee as well as being a distinguished geologist, recently returned to Los Angeles from Washington where he had a very important interview with President Coolidge regarding construction of the Boulder dam project. Mr. Arnold went direct to Washington following the recent meeting of the American Institute of Mining and Metallurgical Engineers held in New York City.

* * *

Allen T. Towl, New York City, vice president and general manager of the Southern Group of Pipe Lines; E. W. Macklin, assistant superintendent of the Eureka Pipe Line Company with headquarters at Parkersburg, W. Va.; Joseph A. Geiger, general superintendent of the Cumberland Pipe Line Company, Winchester, Ky., and V. S. Swisher, Oil City, Pa., assistant treasurer of the Southern Group of Pipe Lines, attended a directors' meeting of the Eureka Pipe Line Company, held in Pittsburgh.

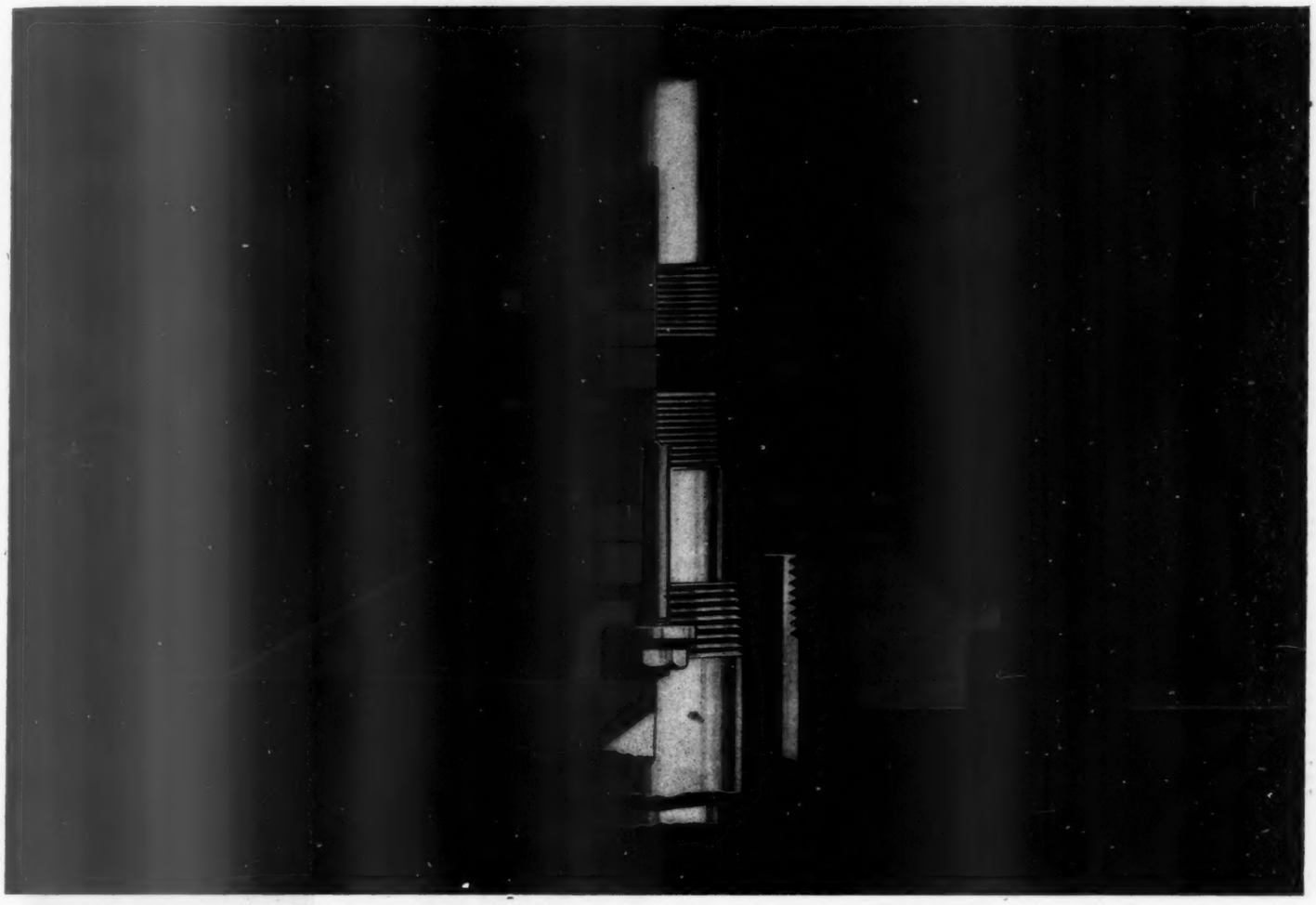
* * *

W. W. Boyer of the United States Geological Survey was a visitor in Casper, Wyo., the past week. Mr. Boyer was formerly assistant to Geologist Collier and the two men surveyed many structures in Wyoming and Montana before the numerous fields were developed. They also prepared several bulletins that are now used as standards for the oil men in that part of the country. Mr. Boyer recently went to Denver from the headquarters of the survey at Washington and will be located in the Rocky Mountain region the coming summer, making reports for the survey.

* * *

W. W. Splane and E. J. Quigley, veteran eastern oil producers and former pipe line men, have returned from a visit to the Hawaiian Islands, and in Honolulu were the guests of Dr. John Christopher O'Day, the leading physician and surgeon of that city. Over 30 years ago the three men had been pipe liners in the northwestern Pennsylvania fields, Mr. Splane as superintendent of telegraph for the National Transit Company; Mr. Quigley, with the United States Pipe Line Company as assistant to President Lewis Emery, Jr., and Doctor O'Day as a telegraph operator and gauger and at the same time a student of medicine in his spare time. Later Mr. Splane accumulated a fortune in oil and gas investments; Mr. Quigley became president of the Pure Oil Company before it was taken over by the Dawes interests, and "Johnny" O'Day became a surgeon of wide repute and is now a prominent figure in Honolulu.

and Control Head



The great majority of oil and gas well fires are preventable. You can minimize the hazard of fire on your leases by equipping each well with a Regan Control Head. Our patented method seals off each string so that there is no escapement of gas. It provides the maximum of safety to the well and to your employees.

Lew D. Hilton, who is in charge of our Mid-Continent office at Houston, has had a wealth of experience in directing oil drilling production and has for many years been recognized as especially qualified on control work. His services or his advice are at your command without charge. Call on him.

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# of Quality Oil Well Equipment

NATURAL GAS DEVELOPMENTS

NEEDS HIGHER RATES, NICHLOS IS ADVISED

OKLAHOMA CITY, Okla., May 1.—Stern Brothers & Co., of Kansas City, and Chicago and New York financiers who had agreed to furnish money to John B. Nichlos of Chickasha to lay a gas pipe line to Oklahoma from the Grady County gas field, have advised Nichlos that his contract for the sale of gas must contain a sliding scale from 15 to 20 cents per 1,000 cubic feet before they are willing to proceed with the financing.

The contract that Nichlos' attorney had prepared, which was to be made with the Oklahoma City Gas & Electric Co., called for a fixed rate of 15 cents at the gate for a term of five years. Ralph E. Davis, consulting engineer for the financiers, recommended an increasing scale in view of the possibility that during the five years Nichlos would have to buy gas in addition to that produced by his wells to comply with the contract. Davis recommended that the contract provide for a rate of 15 cents for the first year, 16½ cents for the second year, 18 cents the third year, 19 cents the fourth year and 20 cents the fifth year.

The amended contract was submitted to the Citizens' Gas Committee of Oklahoma City, representing the city commissioners, the Chamber of Commerce and other organizations, which had recommended a contract between Nichlos and the gas company.

DELIVER GAS TO BAYTOWN

HOUSTON, Tex., Apr. 24.—The Houston Pipe Line Co., subsidiary of the Houston Oil Co., has started delivering natural gas to the refinery of the Humble Oil & Refining Co. at Baytown on the Houston ship channel. The gas is piped from Refugio County. The initial delivery was about 5,000,000 feet per day. One battery of high pressure stills and six boilers are connected. When the connections are completed, between 12,000,000 and 15,000,000 feet per day will be required.

AWARD COMANCHE FRANCHISE

OKLAHOMA CITY, Okla., May 1.—C. O. Moore and T. E. Patten, who have natural gas distribution franchises at Dublin and Stephensville, Texas, have been awarded a franchise at Comanche, Tex. Gas is to be obtained from the Sipe Springs Field. Moore and Patten will install their own distributing equipment in Comanche and the city will not spend $50,000 recently voted at a bond election for that purpose.

GETS ORDER FOR VALVES

The Westcott Valve Co. has been awarded the order for valves for the gas line which is being built by Standard Oil interests from the Monroe Field to Baton Rouge, La. This line is 22 inches in diameter and approximately 175 miles long.

The Westcott Valve Co. announces that the valves on this order will be shipped from the company's new plant in East St. Louis, Ill., which has now been in operation about 60 days.

GAS FOR CUERO, TEXAS

SAN ANTONIO, Tex., May 1.—O. R. Seagraves of the Houston Gulf Gas Co., which is supplying the city of Houston with gas from the Refugio and other fields, has assured the Chamber of Commerce of Cuero that he is reasonably sure his company will be able to serve natural gas to Cuero some time during this year.

METHOD OF TESTING GAS APPLIANCES ON SAFETY FROM CARBON MONOXIDE

By E. R. Weaver, J. H. Eiseman and C. B. Shawn*

Several of the larger gas companies have been for several years systematically testing appliances for use in the territories which they serve, and much progress in the development of appliances has resulted from their efforts. The Bureau of Mines, the Bureau of Standards, two or three university laboratories, several appliance manufacturers and various other organizations have likewise been engaged in the study and testing of appliances. In spite of the efforts which have been made by these organizations there has been an apparent increase in the amount of carbon monoxide poisoning which has occurred in connection with the use of gas, although it is possible that the trouble has not increased, but only that its source has come to be more generally recognized.

The problem of providing safe appliances can not well be solved by merely local action. As this fact became apparent, plans were made for cooperation among those most interested, especially the American Gas Association, the Natural Gas Association of America, and the Government bureaus, with the result that an appliance testing laboratory is being established at Cleveland, Ohio, by the American Gas Association. This laboratory is intended to serve both the natural gas and the manufactured gas industries. To the Bureau of Standards has been assigned the primary responsibility for the basic researches necessary on the utilization of gas, especially upon the development of test methods. In order that the reasons for the various tests may be clearly understood, a general statement will be given of the conditions which make appliance testing necessary and the requirements which the test methods must meet in order that they shall be practicable and significant.

Conditions Make Test Necessary

From the information which has reached the Bureau of Standards in the past two or three years it appears that, although the use of gas provides one of our safest as well as most convenient means of obtaining heat for household use, a certain amount of carbon monoxide poisoning has occurred in connection with the use of domestic gas appliances. The injury caused has ranged from slight periodic headaches to death. The almost universal use of gas in cities makes the aggregate number of such cases a matter for serious concern. The causes which produce this condition exist very generally throughout the United States in the territories served with both natural and manufactured gases. The appliances which cause many minor cases, at least, cannot be regarded as defective or antiquated; nor are they operated under abnormal conditions. On the contrary, many of them are modern, recently installed, and normally adjusted.

It may be briefly stated that there is for every appliance a maximum, and for some appliances a minimum, quantity of gas which can be burned completely and therefore safely, and that this quantity varies with the pressure and composition of the gas supply and the adjustment of the appliance.

There are in the United States about 2,000 gas companies supplying manufactured and natural gas as public utilities. The heating value of the gas supplied varies from 340 to 1,400 B.t.u. per cubic foot, and perhaps more. Pressures at the consumers' appliances differ from not more than 0.5 inch to at least 50 inches of water column. The variation of pressure which sometimes occurs in a given system ranges from less than twice the minimum to 16 times the minimum.

Since blending of natural gas with manufactured gas, or other treatment to increase the supply, has been resorted to in the natural gas regions, there is represented in the whole country a practically continuous range of heating values and pressures from one extreme to the other. So far as the bureau is informed no manufacturer of appliances has any accurate way of determining the limiting conditions of gas supply under which each of his models will operate satisfactorily; and no consumer has any way of assuring himself that his appliance is adapted to his service conditions. Only a few of the larger gas companies have any way of determining what appliance can be used safely under the conditions which they maintain, and even these have no way of controlling the sale by other agencies of unsuitable appliances within their territory, although they often receive the blame for the trouble caused when anything goes wrong with such appliances. Generally speaking, when a gas company desires to change the conditions of its service, either by a change of pressure or of the composition of the gas, it has no way of knowing how many or which of the appliances in service will be unsuitable for the new condition of supply.

It seems evident that the only way of remedying this situation is to determine in a systematic manner the conditions of gas supply for which every appliance offered for sale is suitable; to provide the manufacturer of the appliance with a list of the territories in which such conditions of gas supply prevail; and to provide each gas company with a list of the appliances suitable for use under its local conditions. The systematic supplying of this information to the appliance industry, on the one hand, and the gas industry on the other, is the thing most needed, but it seems possible to accomplish other desirable purposes at the same time.

The thorough testing to which an appliance must be subjected in order to determine under what conditions it can be used with entire safety will indicate in most cases what changes will be necessary in order to make the appliance suitable for the desired market. These changes should be freely suggested to the manufacturer with the ultimate result that the product of a competent manufacurer will not be eliminated from the market but will be brought up to the standard which can be marketed.

A great service will also be rendered to the public if it is possible to so designate an appliance that the purchaser will know at once that a competent authority has determined whether it is or is not suitable for the customer's particular conditions of gas service. It is probable that if the public should become aware of the fact that appliances could be obtained which had been tested for safe and satisfactory performance the demand for such appliances would force out of the market those which did not meet the requirement.

Causes of Carbon Monoxide Production

The liberation of carbon monoxide by gas appliances may be classified under three headings: (1) That caused by accidents over which the manufacturer or user has no control, (2) that produced by conditions which are noticeably wrong and are generally corrected or made the subject of complaint by the user, and (3) that produced by appliances which to the untrained observer appear to be operating normally. The third is the one which is apparently the principal cause of trouble and is the most difficult to eliminate.

Under the first heading are accidental turning on of stopcocks, extinction of the flame by drafts, leaks, etc.

The second class includes flash back, flames blowing from the ports, yellow flames where the appliance is designed for blue, and all other conditions that are noticeably wrong. The majority of the burners used in domestic appliances are blue-flame burners and are so designed that a portion of the air necessary for complete combustion mixes with the gas before reaching the burner ports; this is called "primary" air. The additional air needed is secured from the atmosphere surrounding the flames and is termed "secondary" air. As the amount of primary air which mixes with a given amount of gas is increased a point is reached where the flame either blows away from the ports or flashes back into the burner, depending upon the gas rate and the design

(Continued on Page 132)

*Extract from technical paper of the United States Bureau of Standards, No. 304.

COMPLETING PLANS FOR RECORD GAS CONVENTION

Guy F. Batchelor, secretary of the Natural Gas Association of America and of the Natural Gas Supply Men, Inc., is completing final arrangements for the annual convention of these two organizations which will be held in Tulsa starting May 17 and continuing through May 20.

Guy F. Batchelor

The conventions are expected to attract natural gas company officials and executives of natural gas equipment concerns from all parts of the United States. It will be the twenty-first annual convention of the gas association and will be called the "Coming of Age" convention.

TO EXTEND GAS LINE TO SUPPLY MEXICALI

MEXICALI, May 1.—The Inland Empire Gas Co., which recently secured a State franchise to install and operate a gas plant serving Imperial Valley, has completed arrangements to extend its system to Mexicali in Lower California, according to the announcement of Vice President Lauritzen.

Mr. Lauritzen stated that a syndicate had been formed by Mexican business men to buy gas at a wholesale rate at the international line, and operate its own distributing system on the Mexican side.

Mexicali is the largest city in Imperial Valley, having a population of 12,000, and it is anticipated that the Mexicali extension will be one of the most profitable fields in the valley.

Buda-equipped Lufkin Pumping Unit operating on natural gas

Power of Progress in the Oil Fields

It's a long step forward from the old standard rig, with its belts, bull wheels, bull ropes, timbers and other combustible equipment to the modern pumping unit; and an equally long advance from the large single-cylinder, belted engine to the compact and efficient power plant of the present day.

The all metal, weather-proof pumping unit and hoist made by the Lufkin Foundry and Machine Company, Lufkin, Texas, represents the latest development in oil field equipment. It is powered with a Buda direct-connected four cylinder, heavy-duty oil field engine of the latest design which means ease in starting and the certainty of reliable power.

BUDA POWER, sturdy, sure and economical, is available for many oil field installations. For complete information, address Buda Southwestern Office at Tulsa, Oklahoma.

THE BUDA COMPANY, HARVEY CHICAGO SUBURB **ILLINOIS**

ESTABLISHED 1881

Manufacturers of gasoline, natural gas and kerosene engines ranging in size from 20 to 87 horse power

BUDA
The
ENGINE

EQUIPMENT AND SUPPLIES

PORTABLE PUMPING PLANT NOW ON MARKET

The Gaso portable pumping plant has just been placed officially on the market by the Gaso Pump & Burner Manufacturing Co., following a preliminary period in which the plant has had a thorough try-out in actual service.

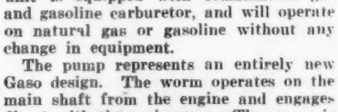
The plant consists of a worm-driven, interchangeable liner duplex piston power pump direct connected to a Buda power unit, all mounted on cushion rubber-tired four-wheel oil country trailer, or on channel iron skids for transporting on field trucks. The unit is particularly designed as a "pick up" for use in case of line break, and as a temporary pumping plant for water supply on wildcat and other drilling operations. The power unit is equipped with combination gas and gasoline carburetor, and will operate on natural gas or gasoline without any change in equipment.

The pump represents an entirely new Gaso design. The worm operates on the main shaft from the engine and engages direct with the main gear. The pump is entirely self-lubricated from an oil bath in which the main gear operates. The pump is interchangeable liner type, with capacity ranging from 62 to 250 bbls. per hour, and pressure range from 800 to 200 pounds per square inch.

This unit is just being placed in schedule. It is stated that a number of oil companies have reported the unit satisfactory as a semi-permanent pumping plant or booster station.

NEW CHROME-VANADIUM STEEL WRENCH OFFERED

A new wrench, drop-forged from chrome-vanadium steel, has just been brought out by the Armstrong Brothers



Tool Co. of Chicago. This extra long and extra thin wrench is an improvement of the alloy steel wrench which this company introduced to the trade in 1919. The demand for "super quality" wrenches, the manufacturers report, has increased until wrenches of alloy steel are rapidly becoming standard equipment where extra strength and length are required.

The Armstrong-Vanadium wrench is drop-forged from chrome-vanadium steel, specially heat treated and finished in nickel over copper, with the heads buffed bright. The jaws are thin and narrow and can get at the nut that is placed in close quarters.

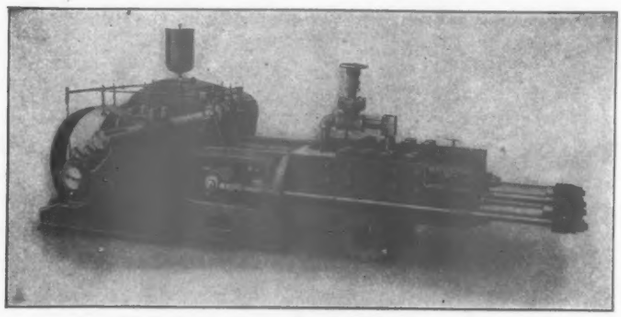
OPENS TULSA OFFICE

The Eclipse Paint & Manufacturing Co., of Cleveland, has opened a Tulsa branch office at 419 South Denver Street, in charge of E. G. Johnson. The company enjoys an extensive business in the petroleum industry and plans to further enlarge this by specializing on paints particularly suitable in the oil business. Five salesmen will be connected with the Tulsa office to cover the Mid-Continent territory, F. M. Crow, formerly with the Union Machine Co., of Bartlesville, being the first of these selected.

NEW MILWAUKEE AGENTS

The George H. Fredericks & Co., 216 West Water Street, Milwaukee, Wis., has been appointed the agent in that city and surrounding territory to handle the full line of products manufactured by the Homestead Valve Manufacturing Co., of Homestead, Pa.

PUMP FOR FEED AND AUXILIARY PIPE LINES



Worthington 4½ by 12-inch forged-cylinder duplex power-driven oil line pump.

The Worthington Pump & Machinery Corp., of New York, has developed at its Deane Works, Holyoke, Mass., a forged-cylinder pump for feed and auxiliary oil pipe lines. In extending its line of forged cylinder pumps into the smaller capacities and pressures, a self-contained, substantial and rigid unit of exceedingly compact design has been made possible.

These forged end pumps are built in capacities up to 40,000 bbls. per 24 hours. The one illustrated is a 4½ by 12-inch, duplex double-acting pump and has a capacity of 6,000 bbls. per 24 hours. It is designed for a maximum pressure of 900 pounds per square inch or a normal working pressure of 750 pounds per square inch. Its overall length is only 12 feet, 10.5 inches and its overall width only 6 feet, 2 inches.

Each cylinder and its passages are tooled out of a solid machine-steel forging. The throats are bronze lined with deep stuffing boxes, the flow is straight and all clearance close. The plungers are of high quality steel, accurately machined and ground round and parallel.

The valve chambers are tooled out of the cylinder forging. Steel ball valves of the encaged type operating on hard gear-bronze renewable seats are used. Each valve is separately accessible from above through individual valve chamber covers.

All parts of the power end of the pump are readily accessible. The crankshaft and connecting rods are steel forgings.

ELECTRIC DIE STOCK HAS BEEN DEVELOPED

An electrically operated die stock for threading ⅜, ½ and ¾-inch pipe has been developed by the Oster Manufacturing Co. of Cleveland, Ohio, for 33 years manufacturers of high grade pipe tools and machines. The die head is actuated by a fully enclosed, universal motor which operates from any lamp socket on either direct of alternating current of 110 volts in any cycle between 25 and 60, inclusive. An aluminum alloy housing that covers the gear reduction from motor to die head reduces the weight to less than 35 pounds and, it is said, makes this new tool as easy to handle as a portable electric drill.

The tool is placed on the end of a stationary length of pipe in exactly the same manner as though the operator were going to thread the pipe by hand. It is centered by means of a universal chuck instead of loose bushings, thereby giving the proper alignment without any loss of time hunting for loose parts and also eliminating filing the burr off the thread before the tool can be placed on the pipe.

A separate die head is furnished for each size of pipe, so that the change from one size to another is quickly made by simply pulling out a pawl which holds the die head to the rotating sleeve, thus disengaging the head from the sleeve and allowing another to be inserted in its place.

The switch is conveniently located at the top of the tool, under the fingers of the operator. The manufacturers offer to send one to any reputable concern for free trial.

FOR EASTERN PAINT USERS

In order to better serve eastern users of spray painting and finishing equipment, an office will be opened in New York City soon by the Binks Spray Equipment Co. M. Sullivan, who for years has held an executive position in the home office of the company at Chicago, will take over the reins of management in New York. This office under Mr. Sullivan's direction, will offer many new advantages for the greater distribution of paints, varnishes, lacquers and like painting and finishing materials as well as spray equipments.

VISITING MID-CONTINENT

Ed. P. Ziegler, vice president of the Franklin Valveless Engine Co. of Franklin, Pa., is spending a couple of weeks in the Mid-Continent fields and will later visit the Rocky Mountain district.

EXECUTIVE PERSONNEL CHANGES ANNOUNCED

The Fort Pitt Steel Casting Co., McKeesport, Pa., has just announced several important changes in its executive personnel.

John W. Guay, formerly sales engineer is now works manager, and H. F. Stratton, formerly in charge of the pattern, mould and core department, is the new superintendent.

Mr. Guay's appointment marks the culmination of 18 years' diversified experience with the Fort Pitt Steel Casting Co., both in the sales and operating departments. He was for several years in the mechanical department of the Pennsylvania Railroad, prior to his connection with Fort Pitt Steel Casting Co. in 1908.

Mr. Stratton has been general foreman of the pattern, mould and core department of this company, prior to his appointment as superintendent. He is a graduate of the mechanical engineering department of Perdue University, and before joining the Fort Pitt Steel Casting Co. in 1920, was for several years connected with the Isaac G. Johnson Co.

OPENS TULSA OFFICE, ANNOUNCING CHANGES

An office was recently opened in Room 805, Mayo Building, Tulsa, by the Hills-McCanna Co. of Chicago. This office is in charge of A. B. Harrison, who previously had charge of the company's business in the East.

The company announces that its connection with the B. V. Emery Co. has been discontinued.

In addition to the regular line of Hills-McCanna products known to the trade, the company is in position to quote prices on return bend fittings and other shapes in cast steel, as well as plug closures and other products made of its No. 45 metal, according to its announcement.

INCREASES CAPITAL

The Reed Roller Bit Co., of Houston, Tex., has increased its capital stock from $1,200,000 to $1,250,000. The funds will be used for improvements to the new plant of the company.

HOME OF NECO PUMPING EQUIPMENT

View of a section of the new plant of the Northrup Equipment Co., manufacturers of Neco pumping equipment, at Parkersburg, W. Va.

Natural Gasoline Value to Be Told

Association of Natural Gasoline Manufacturers Launch Program to Inform Consumers Regarding Product.

By C. O. Willson

Decision to launch a campaign in which the merits of natural gasoline as a necessary constituent of motor fuel, will be made known to the buyers and actual consumers, was the outstanding development of the Fifth Annual Convention of the Association of Natural Gasoline Manufacturers which opened in Tulsa Wednesday at the Mayo Hotel.

Starting with the annual address of President E. L. Peck, who announced that plans for the campaign had practically been completed, the main topic discussed at the two days convention centered around the association's plans to broadcast the story of natural gasoline as blending material in the manufacture of finished gasoline.

The convention in fact constituted the opening gun of the campaign which will be directed by the association, although natural gasoline manufacturers generally, will be asked to support the movement. Several of the speakers in discussing the technical and economic phases of gasoline manufacture and utilization made known the basic facts upon which the campaign will be waged.

The plans, as explained by President Peck, call for extensive advertising in the trade press, educational talks at meetings of jobbers and refiners and other buyers of natural gasoline, together with publicity which will extend to the actual consumers of motor fuels. This advertising and publicity matter will set forth the claims made for natural gasoline covering its method of manufacture and the characteristics which make it of value as a motor fuel product. The economies arising from its use will also be explained to the buyers.

Recent Developments

Several recent developments which were discussed briefly or at length during the convention are responsible for the campaign. Prices on natural gasoline after being maintained at an exceptionally high average over the greater part of 1925 when compared with other grades of gasoline, have slumped this year so that at the present time, according to President Peck, they are at a level which is very close to the border line between profit and loss.

This slackened demand which brought about this unsatisfactory price situation is believed to be due not so much to a seasonal falling off in consumption as to the fact that many buyers especially refiners have arbitrarily reduced the amount of the product used in connection with their refinery operations. A few have practically discontinued the use of natural gasoline while others have curtailed their purchases.

This situation has been due in part to the relatively high prices which prevailed on natural gasoline last year and also the new attitude of the refining and marketing fraternity regarding gasoline manufactured from cracking processes. Previously the cracked gasoline has been responsible in a large measure for natural gasoline demand. The high prices which have prevailed on kerosene so far this year were also held partially responsible for the slump in the natural gasoline market. The high kerosene prices have caused some refiners to manufacture as much of that product as possible rather than securing the naphtha fractions which would ordinarily be blended with natural gasoline to commercial gasoline specifications. At the convention the opinion was expressed that the price situation between gasoline and kerosene is temporary and will shortly return to a normal basis.

High Price Temporary

Regarding the high natural gasoline prices of last year, the president pointed out that they had been offset by relatively low prices in which the buyers had prospered at the expense of the natural gasoline manufacturers. The fair basis, it was said, was a price which allowed a profit to both buyer and seller.

Regarding cracked gasoline, the attitude of the natural gasoline industry is apparently to be that granting all that is claimed for gasoline of the pressure stills, the product when blended with natural gasoline is still a better motor fuel. No attempt was made by convention speakers to attack the research findings which are responsible for the new attitude in regard to cracked gasoline or any product used as a motor fuel. The opinion was expressed, however, that there was considerable misunderstanding and wrong interpretation regarding the relative values of the several types of motor fuels.

The position of the manufacturers was summarized in the statement that "this association is a highly volatile but anti-knock organization." The necessity of volatility in motor fuel was emphasized by several speakers.

Clayden Address

In this connection one of the interesting papers presented at the convention was that of A. Ludlow Clayden, research engineer of the Sun Oil Co., Philadelphia. In a summary of experimental work conducted at the Sun company laboratories he presented data covering a blend of natural gasoline with a straight-run gasoline and also cracked gasoline. This test showed that natural gasoline added to the anti-detonating characteristics of both refinery products, although not as much as benzol, which is also widely used as a blending material. Based on the Sun company research the greater the anti-detonating characteristics of the refinery product, the more value will be the addition of natural gasoline in blending for a finished product.

Dr. E. R. Lederer, vice president of the Texas Pacific Coal & Oil Co., a veteran refiner as well as natural gasoline manufacturer, in his address which was devoted to the economic more than the technical phases, maintained that natural gasoline was essential in motor fuel because it gave more power, was anti-detonating and gave the volatility necessary for ease in starting a car.

The lighter hydrocarbons found in natural gasoline, according to Doctor Lederer, detonate less readily than the heavier hydrocarbons secured in crude distillation and at the same time are higher in calorific value, an important factor in power. The same lighter fractions, he explained, gave the volatility required by the motorist who insisted on a quick start for his car.

From the marketing angle he predicted that natural gasoline would be in demand in the future as it has been in the past to bring to specifications the high initial and end point naphtha cuts, more and more of which are being secured in skimming and cracking processes. In the opinion of Doctor Lederer, modern refining methods will tend to increase rather than lessen the demand for natural gasoline.

Although the papers concerned with motor fuel values featured the convention program, several other phases of the industry were presented in prepared addresses and the discussions which followed.

Arthur L. Davis, chief chemist of the Empire Refineries, Inc., Okmulgee, Okla., gave the results of experimental work in absorption oil for natural gasoline manufacture which had given a better quality product at less cost. This paper gave interesting data covering the absorbing power of the several hydrocarbon series.

The new absorbent oil has an initial of 400 degrees Fahrenheit, with a maximum of 500 degrees Fahrenheit and an average boiling point of 450 to 460 degrees Fahrenheit. The saturation is the same as now required at 30-40 pounds lower operating pressure. The vapor pressure is slightly higher.

Appraisal Work

A. B. Morris, appraisal engineer of the Chestnut & Smith Corp., Tulsa, presented a valuable paper in which he discussed the several phases of appraisal work in the natural gasoline industry. The discussion was specially enlightening in view of the fact that it is often claimed that many manufacturers are operating at a loss rather than a profit as they believe, if they properly considered all factors which enter into profit when considered over a period of several years.

W. R. Boyd, assistant secretary and general counsel of the American Petroleum Institute, officially represented the organization at the convention and on Thursday morning delivered a well received address in which he emphasized the importance of co-operation within the oil industry made possible through trade associations.

The association, through its president, condemned the practice of giving bonuses and other forms of premium paying in the purchase of gas. This practice, it was said, created false impressions among the sellers of gas as to the value of their product and in the end the entire natural gasoline industry suffered.

The criticism of this practice was closely linked with the increasing use of the so-called "portable plants." These plants which consist only of absorption, distillation and cooling divisions have been installed throughout the Mid-Continent and California fields. The larger operators take the position that these small plants have attracted many outsiders into the business who have been led to believe that large profits were certain through their operation. These new operators, it is said, have offered to pay prices for the gas which are out of line with its value based on the experience of established operators who take the settled as well as the flush production of wells. President Peck, in his address, said that the only use for the portable equipment was in new fields to take care of the gas while permanent equipment was being built.

CONVENTION ADDRESSES

The following addresses delivered at the Fifth Annual Convention of the Association of Natural Gasoline Manufacturers will be found in this issue:

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LARGE ATTENDANCE AT BUSINESS SESSIONS OF GASOLINE CONVENTION

Approximately 250 members and visitors attended the opening business session Wednesday morning of the fifth annual convention of the Association of Natural Gasoline Manufacturers. The convention sessions which extend through Thursday are being held at the Hotel Mayo, Tulsa.

F. L. Chase, vice president of the Lone Star Gas Co., Dallas, Tex., in his address of welcome stressed the importance of the business sessions as the medium for the exchange of ideas by those engaged in the several departments of the natural gasoline industry. In support of his contentions he told of one manufacturer who stated that he had increased his gasoline output 250,000 gallons in one year due to a suggestion received while attending the business sessions of the annual convention last year.

Those in attendance consisted largely of field men from all parts of the Mid-Continent who were especially interested in the report of the gas testing committee which was given by George P. Bunn, assistant superintendent of the gasoline department of the Phillips Petroleum Co., Bartlesville, Okla.

This is one of the most important problems before the natural gasoline industry and considerable discussion followed the presentation of the report. The committee has been working for several months to devise a standard method of determining the gasoline content of gas which would be acceptable to both the sellers and buyers. Present methods are not uniform in the different fields and among the natural gasoline companies, resulting in many disputes.

Code No. 1

The committee is working with a similar committee from the Natural Gas Association of America. In fact the tentative report of the natural gasoline committee is based on what is known as Code No. 1 of the Natural Gas Association which is the official pressure method of measuring gas of that association. The natural gasoline committee accepted this method for the most part but suggested a few changes. The recommendations of the committee will first be passed on by the directors of the Association of Natural Gasoline Manufacturers.

It is expected that the final action will be taken by the two associations when the Natural Gas Association holds its annual convention in Tulsa during the week starting May 17.

It developed Wednesday morning that conditions in regard to natural gasoline manufacture in California differed radically from those existing in the Mid-Continent Field and other parts of the country. George A. Ratcliffe, formerly of the Mid-Continent Field, but now connected with the General Petroleum Co. in California, explained at some length the differences which will make it impossible for the West Coast operators to adopt the Mid-Continent methods of testing.

He explained that approximately 25 per cent of the natural gasoline production on the West Coast was mixed with crude and transported by pipe line to the refineries. Approximately 50 per cent is transported directly by pipe line to the refineries at 30-pound pressure. The compression method of testing, he said, is seldom used. One of the simplest tests he explained, was what was termed the "freezing method." In this test the gas is passed through a glass tube surrounded by carbon dioxide, snow and ether. The condensate is caught and measured in separate containers. This method, he said, had been found to give very uniform results.

Chairman Chase appointed D. E. Bu-

(Continued on Page 80)

Anti-Knock Effect of Natural Gasoline

Laboratory Tests Show Product When Blended with Mid-Continent Cracked Gasoline Adds to Motor Fuel Value

By A. Ludlow Clayden*
Research Engineer, Sun Oil Co., Philadelphia

This paper is purposely brief since the subject is being covered in a more exhaustive manner by Doctor Leslie and Doctor Brown. The writer considered that an independent check of the anti-detonating value of natural gasoline might be interesting to compare with the results obtained by the authors of the more complete paper.

Since there is no absolute measure for detonation it is inevitable that different results will be obtained when different equipment is used. The method employed by the writer for testing the detonating qualities of fuels is to run them in a single cylinder engine, equipped with the Midgley Bouncing Pin apparatus. The engine used is a Regal marine engine, 4-inch bore by 5-inch stroke, with a special piston which increases the compression to the ratio of 5.25 to 1. This gives a very flat combustion chamber form since the motor is an "L" head and, consequently, the detonation is very violent for the degree of compression employed. The compression ratio of 5.25 to 1 in this engine is probably equivalent to at least 6 to 1 in an engine of more compact construction.

The Midgley instrument is now so well known it is unnecessary to describe it again. The author will merely make the reminder that the measurement of detonation is made by observing the rate at which gas is formed by the electrolysis of water. The gas is collected in a graduated tube and the author's system is to compare fuels on the basis of the time required for the formation of one-half cubic centimeter of gas. This means that the better the fuel, the longer the time.

The standard of comparison used in the Sun Oil Co.'s laboratory is a supply of straight run California gasoline of approximately United States Government specification. A considerable quantity of this was set aside originally and is matched by blending other gasolines, so that the consumption of the standard fuel is very small. The engine and the Midgley instrument are so adjusted that with the standard fuel 100 seconds is required for the formation of the one-half centimeter of gas. The fuel is then changed, an observation made, and then immediately another run is taken on the standard fuel. Results should check within 3 per cent if the instrument is functioning properly. Results which do not check within this limit are discarded.

Anti-Knock Characteristics

For the purpose of these tests a gasoline was chosen cracked from Mid-Continent gas oil which had a figure of merit of 100, in other words, it happened to be exactly the same as the straight run California standard. Blends were made with 10, 20 and 30 per cent of casinghead and the results were as follows:

Fuels—	Detonation Figure of Merit
Original gasoline	100
Plus 10% casinghead	115
Plus 20% casinghead	130
Plus 30% casinghead	150

A further comparison was made, using benzol instead of casinghead, which showed that 10 per cent benzol gave a figure of merit of 150, or that the casinghead, an anti-detonating blend material in this particular gasoline, had a value approximately one-third that of benzol.

Tests also made on similar blends of 10, 20 and 30 per cent with a straight run gasoline having an original figure of merit of 75 were considerably inferior to the cracked Mid-Continent. In this case the effectiveness of the casinghead was only one-half what it was in the other series of tests. In other words, its benzol value was approximately one-sixth instead of one-third. This is a somewhat curious result but one which has been observed many times before in blending for anti-knock quality. It apparently does not necessarily follow that the effectiveness of the anti-knock blending agent is equally great with all gasolines. This is most likely due to the probability that the Midgley instrument does not give readings in direct proportion to the violence of detonation, but to some power of the actual violence. For instance, benzol blended with a fuel having a figure of merit of say 60 will not show the same percentage in figure of merit as it will when blended with a better original gasoline. In other words, it is easier to improve a fuel from a figure of merit of 100 up to 150 than it is to improve a poorer fuel with a figure of merit of 50 up to 75.

Midgley Instrument

The Midgley instrument is capable of giving highly accurate and entirely reproducible results, but like most precision instruments it requires careful handling, and the greatest precaution must be taken in order to obtain check results. It is perhaps worth noting that the action of the instrument depends upon the following factors:

Extreme cleanliness of all moving parts.

Clearance between top of pin and lower contact blade.

Clearance between contact points.

Accurate facing and cleaning of the contacts.

Absence of lubricating oil.

Absence of soot.

Regularity of temperature of the instrument.

Spark advance.

Mixture richness.

Humidity of the atmosphere.

Perfect valve seating.

Variations in any one of these things can throw out the reading or make it erratic, but cleanliness is the most important. It is essential to take the instrument completely apart and go over every bit of it every few hours of running.

This looks like a rather formidable list of possible sources of error, but in actual practice it is not difficult to control them all.

*Before annual convention Association of Natural Gasoline Manufacturers, Tulsa, May 5 and 6.

Cheap Natural Gasoline a Waste

Product Great Natural Resource and Should Not Be Sold at Sacrifice Prices. Necessary to Secure Volatility in Motor Fuels

By John M. Hall
Manager, Oil State Gasoline Co.

Our government and every individual is deeply interested in the conservation of petroleum and its products in our own country, as well as in the oil producing territories throughout the world. We have instances in the last century where governments and individuals unwisely or through corruption squandered, dissipated and diverted natural wealth and resources. Fortunately, the trend of modern times is toward conservation and the fact that the petroleum industry can be expected to do its part is shown in the increasing amount of motor fuel now being manufactured in which natural gasoline, gasoline made from gas as distinguished from gasoline made from crude oil, is playing no small part.

This article will deal briefly with the industry in general, calling attention more particularly to the natural gasoline industry which will be a vital factor in any petroleum conservation program of the future. The world very willingly admits American supremacy in the petroleum industry and we very graciously accept the honor, although we possess approximately only one-twelfth of the petroleum resources of the world, and the petroleum reserve of no other country has been so extensively drawn upon to meet foreign demands.

Conceding much improvement in the future in refining operations as well as in engineering achievements and inventions, the day is coming when our domestic demand will exceed our petroleum supply. Gasoline consumption is increasing at the rate of 16 per cent each year and doubles itself each 16 to 20 years. Are we doing all possible to delay this day by conservation and is our government demanding and laying proper plans so that we will have the opportunity to explore and develop the petroleum resources of the world without discrimination,—or are we just drifting? The part we will play in the future world development of petroleum will be largely determined by the extent we are permitted to enlarge our foreign explorations and develop and produce petroleum unhampered on foreign soil. Today our petroleum resources are open to the world, and it seems we should have a definite understanding as to what position other nations are to assume in the future with reference to their petroleum development, and govern ourselves accordingly.

One of the most immediate and practical opportunities for the conserving of petroleum in this country is the further development and use of natural gasoline which has already proven of great economic value. The Department of Commerce-Bureau of Mines bulletins giving motor fuel statistics for the year 1925 reports 1,103,000,000 gallons of natural gasoline produced and used throughout that year, which was 9.83 per cent of all motor fuels produced. Seventy-five per cent of the natural gasoline produced was used in refineries, or 7.61 per cent of the total gasoline produced at refineries was natural gasoline. We hope that the above statistics together with the discussion which follows will enable you to realize the tremendous growth and development of this industry in the last few years and to see some of its capabilities as well as its possibilities.

For those who are not familiar with our product, permit me to explain briefly from what natural gasoline is produced, what it is, and how it is made. In the producing of oil, gas is usually found in the oil producing formations or in close proximity, and after the oil flows or is pumped into tanks, the gas is produced either with the oil or comes out of the casing between the casing and tubing through the casinghead. This gas formerly was wasted into the air together with the gas produced with the oil—both a total loss and an economic waste. Its gasoline content which condenses in the lines and is both dangerous and unsatisfactory for use in the development or operation of a lease, together with its pressure which is insufficient to enable it to enter commercial gas lines, even if that were desirable, made it practically a worthless product. This is the gas from which natural gasoline is produced.

A word of explanation as to how the gas obtains its gasoline content might be well at this time. The gas comes in contact with the oil either in the oil formation or on its way out of the ground and absorbs out of the oil some of its lighter gasoline properties or gasses. The gas imbibes itself similar to a sponge thrown into water and its absorbing and cohesive attraction gathers some of the gasoline gases or molecules of gasoline contained in the oil which unites thoroughly throughout the gas, thus becoming what is known as "wet gas." Originally this gas had a specific gravity of weight less than air, therefore, it is incapable of carrying any heavy ends of the petroleum, but to the contrary, absorbs only the lighter and purer gases of the gasoline content of crude oil. Even the more skeptical must admit the purity of gasoline produced under such conditions.

Extracting Gasoline

The three principal methods of extracting the gasoline content from gas are as follows:

First: By compressing the gas through powerful compressors and then passing it through cooling coils which condense the gas into a liquid known as natural gasoline.

Second: By passing the gas through absorbing towers which contain a heavy absorbing oil that requires from 450 to 550 degrees of heat to start it to vaporizing. This is well over the end point or final distillation of natural gasoline which runs between 350 and 375, thereby removing any possibility of the absorbing oil when it is run through the still and heated to throw off its gasoline saturation which it has absorbed in the towers contaminating the gasoline vapors that pass through the cooling coils and condense into natural gasoline. This process is known as the absorption method. In many instances the compression and absorption methods are used together.

Third: By passing the gas through charcoal. This method is very similar to absorption through oil and equally proficient in avoiding any heavy ends getting into the natural gasoline. Most modern gasoline plants are equipped with treating plants which produce a doctor sweet product. It is now ready for market being graded both as to its distillation recovery which runs from 78 per cent to over 90 per cent and its gravity which ranges between 72 degrees and well over 90 degrees. When it is convenient and profitable, the refineries purchase these grades and run them through their stills, thereby raising the lower gravities of their gasoline and naphtha up to commercial specifications ready for consumption. In

(Continued on Page 118)

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Successful Year in Gasoline Industry

President E. L. Peck in Annual Address Reviews Accomplishments of Past Year. Scores Bonus Paying for Gas.

By E. L. Peck*
President, Association of Natural Gasoline Manufacturers

This convention marks the fifth anniversary of the Association of Natural Gasoline Manufacturers. On April 21, 1921, the association was brought into being at an enthusiastic meeting of nearly 100 natural gasoline manufacturers. They were then in the midst of a debacle. They had seen the pendulum of their business swing from the heights of prosperity to the depths of adversity. They had endeavored to correct the situation by individual action and had failed. There was but the one thing left and that was to try and do by cooperation what individual action had failed to accomplish. The result of that meeting was this association.

I cannot refrain from commenting on the splndid growth and financial condition of the association, which will be made in detail by our secretary-treasurer, Mr. Bourque, at the meeting tomorrow. It is gratifying to know that our membership list is constantly growing and that the treasury is in a healthy condition.

When I referred to the meeting at which the association was organized, I said that nearly 100 manufacturers attended. I regret to say that, when it came time to pay dues a lot of enthusiasm had waned and only 17 actual members were enrolled immediately following that meeting. However, at the present time, with more than 50 active members on our rolls, we have between 60 and 70 per cent of the total natural gasoline production of this country represented in our membership.

I wish to mention briefly the principal activities and accomplishments of our association during the past year. Through the efforts of some of our members, a change was effected in the A. S. T. M. method of distillation for natural gasoline, and, following the tentative adoption of the new method by the American Society for Testing Materials, our association adopted it, and our specification cards were revised to carry the method thereon. These cards have been most widely distributed, so wide, in fact, that a reprint was necessary. The new method fairly and favorably affects the natural gasoline manufacturer as it eliminates possible controversy on this point. At the same time, the A. P. I. coefficients of expansion were adopted by our association so that the whole petroleum industry is now in harmony on that detail of tank car measurement of our products.

Our association has been represented at all important petroleum conferences held during the year by specially delegated members of our organization, its secretary and president. These meetings have included general, special technical, general transportation, and public relations meetings of the American Petroleum Institute; Interstate Commerce Commission and Bureau of Explosive hearings; meetings of D-2 Committee of the American Society for Testing Materials; National Petroleum Marketers and American Oil Men's Associations, as well as various State Jobbers' meetings; meeting of the Western Petroleum Refiners' Association, meetings with the Osage Oil & Gas Lessees' Association on the question of return of residue gas, and at various freight rate hearings throughout the year. In addition, our association has been honored with representation on the Advisory Committee of the Federal Specification Board, a valuable appointment from the standpoint of the natural gasoline manufacturer.

Plant operators meetings held in the fields were continued this year, and were quite successful considering weather and other conditions prevailing at the time.

Association's Activities

The association has cooperated with the Safety Petroleum Council of the Mid-Continent Oil & Gas Association in securing safe and sane safety regulations governing natural gasoline plants. This was done through meetings with the Oklahoma State Commission of Labor in Oklahoma City, in Tulsa, and by a trip with him to the field. It is a pleasure to report that the Commissioner stated that his department has received fine cooperation from the natural gasoline industry of Oklahoma.

The close of the year finds our association maintaining the same harmonious relations and cooperating with other petroleum associations and the oil industry generally. The year that has just passed is now history. What of the year ahead? The association, while looking backward for a brief time at each annual meeting is, and always must be, if it will succeed, a forward-looking organization. Therefore, it is to thoughts and plans for the future that we should direct most of our attention.

The year 1925 entered upon a period of relative prosperity for our industry which has not been equalled for some years. This condition prevailed well through the summer and late fall, but during the last few months of that year

*Address at annual convention, Tulsa, May 5.

TRAFFIC MEN FAVOR STANDARD METHOD FOR GAUGING TANK CARS

By Neil Williams

Under the auspices of the Association of Natural Gasoline Manufacturers, a conference for all traffic men of the Mid-Continent Field was held in conjunction with the association convention at Tulsa May 5. At the morning session more than 35 representatives of traffic departments of both refining and natural gasoline companies were registered.

Following a general discussion on "Calibration of Tank Cars" and "Loading of Natural Gasoline in Reference to Proper Outages" the gathering went on record as favoring standard specifications for gauging capacities of tank cars and a uniform method of settling freight charges on outages.

The former subject, "Calibration of Tank Cars," was the center of considerable lively discussion participated in by the traffic men as well as by the mechanical men familiar with tank car problems and representatives of tank car manufacturers who also were present.

In the discussion many of those present claimed that their companies were losing thousands of dollars through alleged inaccurate gauging of tank car capacities. It was pointed out that in many cases tank cars have from 3 to 100 gallons greater capacity than the amount figured by the car manufacturers and stenciled on the cars, this causing gasoline sellers to ship considerably more material than called for in invoices.

Representatives of tank car manufacturers and mechanical men present pointed out that whatever discrepancies there were in capacities of cars was due not to errors on the part of gaugers particularly but chiefly to the great variety of methods in estimating capacities.

It was shown that nearly every company has its own method of computing the capacities of cars. In strapping cars, some engineers and gaugers will include the dome pockets while others will not; some will make certain allowances for rivet heads and others will figure on an entirely different basis.

It was to correct this trouble that the gathering unanimously voted to place before the American Petroleum Institute at once a proposition to get the United States Bureau of Standards to adopt uni-

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THOSE ATTENDING FIFTH ANNUAL CONVENTION ASSOC TION

and the first quarter of 1926, a decided relapse has occurred not wholly accounted for by seasonal conditions. We have not only seen the price decline to where it about equals the cost of manufacture, but we have heard predictions of future disuse of large quantities of our product. The cause of such predictions cannot be laid wholly at our door, and we must not stand idle and permit them to become a reality.

Effect of Kerosene

One of the factors which has adversely affected the natural gasoline market for the past few months has been the abnormally high market for kerosene. Temporarily, the refiner finds that a certain portion of the crude, which formerly was being made into motor fuel with the aid of natural gasoline, can now be more profitably sold as kerosene. It is quite possible, however, that present large runs of kerosene cannot long continue to find so profitable a market, and it is just a matter of time until this stock will again be converted to motor fuel and call for a proportionate amount of natural gasoline.

It is true that for a short period last year, a wide margin prevailed between the selling price of natural gasoline and the sales price of U. S. Motor gasoline in favor of the natural gasoline manufacturer. It is equally true that a similar condition with the margin in favor of the buyer has prevailed many times in past years. However, the fact remains that except when a basis and range of prices is existing, which not only allows the natural gasoline manufacturer a fair margin of profit over cost, but also permits the buyer to use natural gasoline at a cost, which of itself, will not prevent the buyer from making a fair profit on his finished product, then and only then will that phase of the situation be satisfactory. That is the basis of all successful business and it is to be hoped that both the buyer and seller of natural gasoline will keep it in mind.

In the past, natural gasoline manufacturers have taken no very definite steps to present the merits of their product to consumers except in a rather desultory way. It is very desirable that definite emphatic measures be started and continued in order to fully advise all possible consumers of the various qualities and characteristics which constitute the values in natural gasoline. The individual manufacturer cannot hope for success by his own unaided effort. As the general collapse of 1919-20 proved, individual effort availed nothing and it is safe to predict that such individual effort in a general publicity campaign would fall far short of the desired result. The only way tangible, favorable results can be assured is through the combined efforts of all natural gasoline manufacturers. The members of this association for many months, have given serious thought to the matter of product publicity and have made plans which will be put into practice begginning with this convention. The Convention Program Committee has provided a noteworthy opening for such an educational campaign by securing distinguished authorities on the qualities of gasoline as speakers on this program; our Publicity Committee is preparing, through the news columns and advertising pages of various trade journals, to launch an educational campaign in the immediate future; the association has asked for and will probably receive invitations to appear on the programs of various national and state marketing association meetings and the association is determined to leave no stone unturned to prevent natural gasoline from suffering due to lack of knowledge of the facts involved, when compared with any other component entering into the manufacture of motor fuel.

This association is a highly volatile, but anti-knock organization. It has performed a great service to its branch of the petroleum industry in the past and has an even greater field of usefulness before it. There is not a manufacturer of natural gasoline, large or small, but who would profit greatly by being a member. The burden has been carried by relatively few. Man power, brain power and money power are necessary if the association is to accomplish greater things in coming years than it has in the past. The present members are willing to do their part in the future as they have been doing, but too many non-members have been willing to let "George" do it. In view of the work which lies before the association this year, I appeal to every natural gasoline manufacturer to lend your name, your moral and your financial support to this undertaking.

Portable Plants

All of our problems are not from the outside by any means. Careful consideration should be given to conditions within the industry itself, if we are to preserve our investments and realize a reasonable profit from our business. I refer particularly to ruinous competition, giving of bonuses and premiums for gas contracts, and the misuse of the so-called "portable plant" in the hands of those who are not in the natural gasoline business from the standpoint of permanency, but rather think they see an opportunity of "getting rich" in a few months in spite of the fact that they contract to pay prices for gas which all past experience proves cannot be done when allowance is made for plant amortization, interest on investment and reasonable profits.

Consider the cause and effect of premium payments in the purchase of crude oil. One purchaser desires more oil of a certain gravity in a particular field and takes the connection from a competitor by paying a premium over the posted price. A short time later the same connection is taken from him by a third competitor who pays a still greater premium and who thinks he can see still more value in the particular oil. Thus the game progresses until the market for refined products meets a period of depression, then down tumbles the price of crude oil until it is again in balance with the available price for refined products. The premium practice in the case of casinghead gas purchase, however, is not so simple, for it is not subject to readjustment when a period of depressed markets is faced by the purchaser. Instead, due to the fact that such purchases are made on a contract over a definite period of years, the premium must be paid for the life of the project regardless of markets or other conditions which may render such payment unprofitable and very burdensome to the gasoline manufacturer.

Paying Bonuses

In general, the payment of bonuses or premiums above the fair prevailing market price for casinghead gas, even if possible in a very limited number of

(Continued on Page 148)

REGISTRATION AT CONVENTION

Walter Beets, Phillips Petroleum Co., Henryetta.
H. F. Quinlan, Chestnut & Smith, Tulsa.
Charles F. Smith, Chestnut & Smith, Tulsa.
S. C. Carney, Roxana Petroleum Corp., Tulsa.
E. Love, Victor Co., Tulsa.
Charles H. McBurney, Transcontinental Oil Co., Tulsa.
L. Todd, Gypsy Oil Co., Tulsa.
Mary Baxter, Phillips Petroleum Co., Bartlesville.
L. H. Sexton, Phillips Petroleum Co., Bartlesville.
J. M. Hall, Oil State Gasoline Co.
H. V. Price, Oil State Gasoline Co.
E. W. Melling, D. E. Foster Gasoline Co., Deer Creek.
D. E. Buchanan, Chestnut & Smith, Tulsa.
S. R. Merley, H. L. D. & Co., New York, N. Y.
C. C. Woodruff, Roxana Petroleum Corp., New York, N. Y.
C. L. Seideman, Imperial Refining Co., Tulsa.
S. M. McAnelly, Chestnut & Smith, Tulsa.
C. Morris, The Oil and Gas Journal, Tulsa.
J. L. Dwyer, The Oil & Gas Journal, Tulsa.
J. A. Montgomery, Paige & Jones Chemical Co., New York, N. Y.
R. M. Moore, Paige & Jones Chemical Co., New York, N. Y.
W. R. Boyd, Jr., American Petroleum Institute, New York, N. Y.
G. L. Young, Signal Gasoline Co., Tulsa.
Leo Kaufman, Southern Chemical Manufacturing Co., Tulsa.
Emil Ofenbacher, Arrow Gasoline Co.
Walter Davis, Detroit Graphite Co., Tulsa.
T. C. Andrews, American Car & Foundry Co., St. Louis, Mo.
G. M. Davidson, Empire Gasoline Co., Bartlesville.
J. B. McIntyre, Standard Tank Car Co., Tulsa.
C. S. Peppers, Peppers Gasoline Co., Enid.
W. W. Sawyers, Chestnut & Smith, Kiefer.
James A. Morgan, Chestnut & Smith, Tulsa.
John W. Crowe, Chestnut & Smith, Tulsa.
T. G. Landry, Smith Separator Co., Tulsa.
W. W. Klingensmith, Transcontinental Oil Co., Tulsa.
F. A. Matthews, Pure Oil Co., Tulsa.
H. R. McCreary, Oil Conservation Engineering, Cleveland, Ohio.
C. R. Musgrave, Phillips Petroleum Co., Bartlesville.
J. M. Scott, Bureau of Explosives, Kansas City, Mo.
S. R. Scott, Bureau of Explosives, Kansas City, Mo.
B. F. Masten, Pacific Gasoline Co., Los Angeles, Calif.
R. E. Cameron, Pacific Gasoline Co., Taft, Calif.
Charles H. McNeil, Shamrock, Okla.
F. Baird Smith, Quaker City Tank Line Co., St. Louis, Mo.
J. L. Snyder, Quaker City Tank Line Co., St. Louis, Mo.
F. A. Osgood, Marland Refining Co., Ponca City.
R. D. Howard, Marland Refining Co., Ponca City.
R. M. Coate, Marland Refining Co., Ponca City.
W. G. Baker, Roxana Petroleum Corp., Tulsa.
A. F. Maxson, Sun Oil Co., Tulsa.
H. Jungerman, C. J. Tagliabue Manufacturing Co., Brooklyn, N. Y.
Henry N. Wade, J. A. Campbell, Long Beach, Calif.; Los Angeles, Calif.
Fred F. Ketchum, Owens-Libby-Owens Gas Dept., Charleston, W. Va.
Otto Wommack, Los Angeles, Calif.
Paul Truesdell, National Petroleum News, Cleveland, Ohio.
B. W. Vinson, Andrews-Bradshaw Co., Tulsa.
D. B. Campbell, Jr., Enfisco Gasoline Co., Weleetka.
M. T. Smith, Sand Springs Gas Dept., Sand Springs.
W. F. Macdermott, Hirt and Macdermott, Fort Worth, Tex.
R. D. Turner, Skelly Oil Co., Tulsa.
A. I. Sellars, Skelly Oil Co., Tulsa.
F. R. Quast, Empire Gasoline Co., Webb City.
R. H. Clark, Phillips Petroleum Co., Bartlesville.
C. O. Willson, The Oil and Gas Journal, Tulsa.
F. A. Jerden, The Oil and Gas Journal, Tulsa.

(Continued on Page 148)

TION NATURAL GASOLINE MANUFACTURERS, TULSA, MAY 5

Photo by Ward, Tulsa.

New Method of Testing Volatility

Simple Continuous Distillation Measurement Suggested As Being More Satisfactory to Refiner and Consumer

By W. S. James*

While the importance of suitable volatility of motor fuels needs no comment, I believe, the general method now used to measure volatility is unsatisfactory. These fuels are vaporized in an engine by a continuous process of distillation but their vaporization characteristics are measured by batch distillation. Is it surprising, therefore, that extreme difficulty is encountered in correlating the temperatures of test with those of actual use?

Carbureted fuels burned in internal-combustion engines have been, and always will be vaporized in the manifold and cylinder by what is commonly termed "continuous distillation." Fresh gasoline is supplied to the engine continuously by the carburetor and, as it passes through the manifold to the combustion chamber,

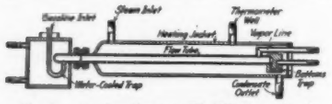


Figure 1.—Continuous-Distillation Test-Apparatus. This first apparatus is made of standard pipe and is mounted at a slight incline so that the gasoline flows slowly from left to right and is heated by a steam bath. Vapor pass off through the vapor line to a condenser and the unvaporized bottoms are collected in the bottoms-trap and cooled. Premature vaporization of the gasoline is prevented by the water-cooled trap at the left.

is vaporized continuously. The lighter portions are vaporized first, then the heavier and next heavier portions until, if the proper temperatures are reached, all of the fuel becomes a vapor. During this vaporization process, all of the constituents of the fuel are present at any cross-section of the manifold, the proportion of the fuel that remains in the liquid state being controlled by the temperature of the liquid particles.

An entirely different method, commonly termed "batch distillation," is employed for measuring the volatility of motor fuels that are vaporized in the way described. A certain volume of the fuel is placed in a distillation flask and its temperature is raised slowly. As vapors are formed, they pass from the flask and are recondensed. This process is continued until all of the liquid is vaporized. When the heavier portions are being vaporized, the vapor from the lighter portions has been removed from the contact with the unvaporized liquid. Such a condition rarely, if ever, exists in an engine.

Petroleum products were produced by batch distillation until recent years but today very few are produced by this method, and gasoline never; the process is too slow and expensive. Gasoline is removed from crude oil by continuous distillation or is produced by cracking and continuous fractionation. Consequently, the temperatures of production bear no rational relation to those of test by batch distillation. Some obvious questions arise from these facts such as (a) Why cannot the volatility of a motor fuel be measured by a continuous method of distillation? (b) Can the temperatures of test obtained by continuous distillation be translated readily into those of production and use? (c) Are the difficulties encountered in a continuous distillation in the laboratory so great as to make such a test impractical for routine use?

Distillation Test-Apparatus

In an endeavor to obtain answers to these questions, the **simple** apparatus shown in Figure 1 was constructed. It consists of about 18 inches of one-half-inch pipe welded into a piece of 3-inch pipe that serves as a steam, or heating jacket. One end of the one-half-inch pipe, or flow tube, is brought directly through the swaged-down end of the 3-inch pipe and its other end is fitted with a drilled block to serve as a liquid-trap. A vapor line is tapped into the one-half-inch flow tube just ahead of the liquid-trap. The trap and the entrance to the vapor line are enclosed within the steam jacket to maintain them at the same temperature as the flow tube.

Gasoline is fed to the flow tube from a burette, mounted above the water-cooled trap at the left, at a rate of from 2 to 5 cc. per minute. The whole apparatus is mounted at a slight incline and the gasoline leaving the trap passes slowly down the flow tube. Before it reaches the liquid-trap at the right end, it is raised to the temperature of the heating bath and equilibrium is established between the composition of the liquid gasoline and that of its vapor. The vapor then passes through the vapor line to a condenser and the liquid flows through the bottoms trap to a liquid cooler. After sufficient gasoline has flowed through the apparatus to establish a steady regime, a measured volume is flowed through the apparatus and the volumes of condensed vapor and unvaporized liquid are measured. To eliminate complications arising from condensation difficulties, the results of tests with the apparatus, as given herein, were obtained by measuring the volumes of bottoms, or unvaporized liquid, that resulted from flowing either 100 or 55 cc. of gasoline through the apparatus.

It was hardly to be expected that the temperatures desired would fall within the range of 212 to 350 degrees Fahrenheit which could be obtained readily with saturated steam at available pressures, hence a second apparatus was constructed in which the flow tube was heated by an oil bath that could be held at temperatures ranging from 100 to 600 degrees Fahrenheit.

To obtain a clearer visualization of the process of distillation and of the action of the traps, the small glass apparatus shown in Figure 2 was constructed. The flow tube of this apparatus was heated by vapor from a boiling liquid, such as water, benzol and amyl-acetate.

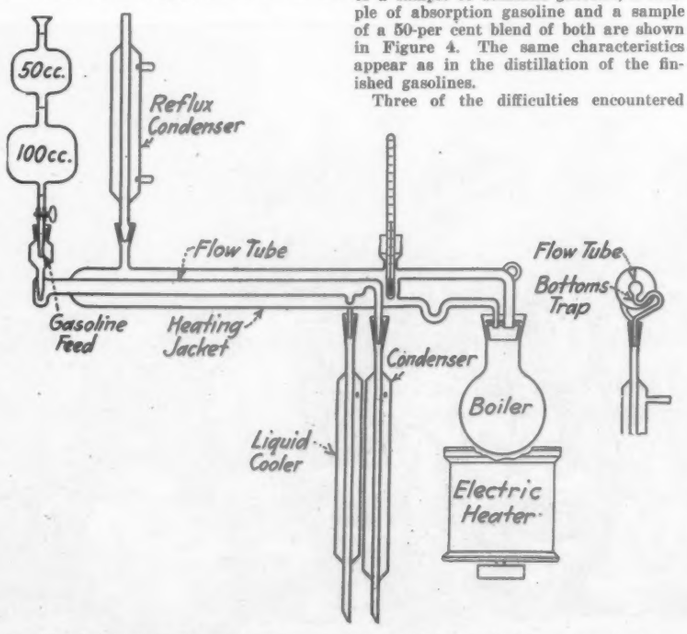


Figure 2.—Test Apparatus Made of Glass. This affords visualization of the distillation process and action of the traps. The flow tube is heated from a boiling liquid, such as water, benzol or amylacetate.

Results Markedly Different

Results of the continuous distillation of four gasolines purchased in the open market are shown in Figure 3, in which the usual batch distillations for these

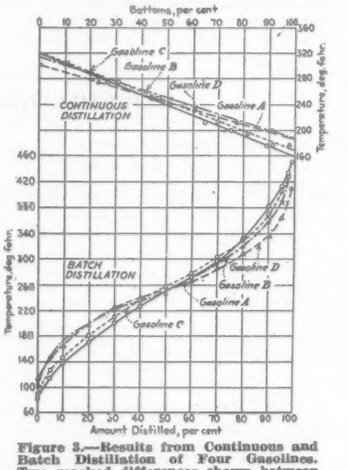


Figure 3.—Results from Continuous and Batch Distillation of Four Gasolines. Two marked differences shown between results obtained from the two processes are that, with continuous distillation, the temperature range is very much smaller and the percentage of bottoms shows approximately linear relation with temperature. Practically nothing is vaporized below 160 degrees Fahrenheit and all the gasolines are vaporized completely at 320 degrees Fahrenheit.

gasolines are also given for comparison. The continuous-distillation tests show two marked differences from the results of the usual batch method. The temperature range is very much smaller and the percentage of bottoms shows approximately a linear relation with temperature. Practically nothing is vaporized below 160 degrees Fahrenheit, and all the gasolines are vaporized completely at 320 degrees Fahrenheit.

Results of the continuous distillation of a sample of domestic gasoline, a sample of absorption gasoline and a sample of a 50-per cent blend of both are shown in Figure 4. The same characteristics appear as in the distillation of the finished gasolines.

Three of the difficulties encountered with the test apparatus are illustrated in this chart. It will be noted that the points marked with triangles are not used in drawing the curves. It was found that when the gasoline was flowed through the apparatus too rapidly the percentage of bottoms was increased, as the gasoline was not raised to the bath temperature, therefore the flow-rate was reduced until the minimum value of the bottoms was obtained. It was also found that when the percentage of bottoms approached 100 per cent the curve seemed to droop more than would be expected from the other points. As the volume of vapor leaving the apparatus under these conditions was markedly less than the volume at the higher temperatures, it was believed that the presence of air in the flow tube reduced the partial pressure of the gasoline, therefore the end of the vapor-condenser tube was trapped, and then the percentage of bottoms fill more nearly on a straight line through the remaining points. When the test temperature was above that apparently necessary for complete evaporation of the gasoline, there was no liquid in the trap at the end of the flow tube and therefore the vapors condensed

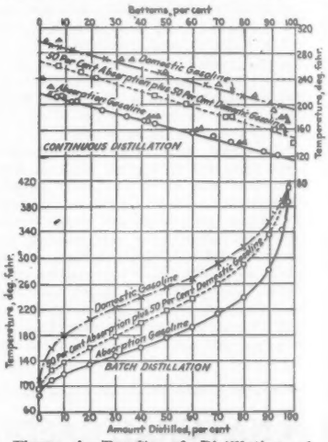

Bottoms, per cent
50 Per Cent Absorption plus 50 Per Cent Domestic Gasoline
Absorption Gasoline
CONTINUOUS DISTILLATION
Domestic Gasoline
50 Per Cent Absorption plus 50 Per Cent Domestic Gasoline
Absorption Gasoline
BATCH DISTILLATION
Temperature, deg. fahr.
Amount Distilled, per cent

Figure 4.—Results of Distillation of Sample of Domestic and Absorption Gasolines and a 50-Per Cent Blend. Points enclosed in triangles were not used in drawing the curves as it was found that the percentage of bottoms increased when gasoline flowed through the flow tube too fast and that it dropped too much as the percentage approached 100, due probably to air in the tube.

partly in the bottoms cooler as well as in the vapor condenser. The needed remedies for these three difficulties are obvious and are easy to find.

Translation of Temperatures

If the laboratory continues distillation of motor fuels is truly representative of the process of distillation in an engine, it should be possible to translate the temperatures of test into those of use if an estimate can be made of (a) the reduction of hydrocarbon-vapor pressure due to the presence of air and (b) the effect of pressure on the temperatures of vaporization. Estimation of the actual partial-pressures of the hydrocarbon vapor in an air-gasoline mixture is simple if the following factors are known:

(1) Molecular weight of the gasoline.

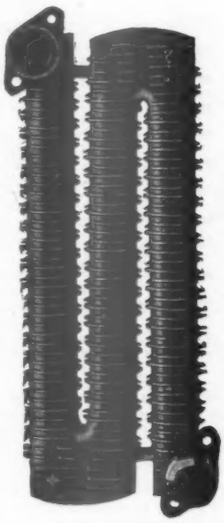
(2) Ratio of weights of air and fuel in the mixture.

(3) Total pressure of the mixture in the manifold.

As the results of a continuous-distillation test show an approximately linear relation between temperature and percentage of bottoms, it seems fair to assume that the temperature of 50 per cent bottoms is the average boiling point. The average molecular weight can then be

*Paper presented at Annual Meeting of Society of Automotive Engineers and reprinted from Society Journal.

Eliminate frequent shut-downs caused by corrosion



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estimated from the boiling points of pure hydrocarbons. The molecular weights of a number of the more common hydrocarbons plotted against their boiling points are given in Figure 5. These curves show the close similarity of the paraffins, olefines and cyclonaphthenes which probably represent the major portion of the constituents of present gasoline.

A method for graphical computation of the actual hydrocarbon partial-pressures for a number of mixture-ratios and manifold pressures is given in Figure 6, in

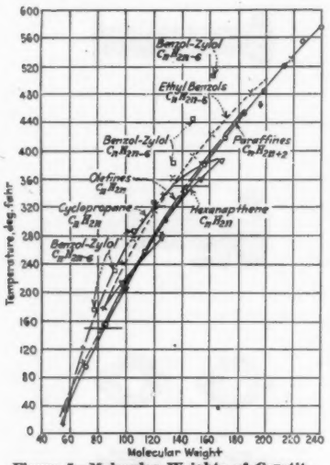


Figure 5—Molecular Weights of Constituents Plotted Against Boiling Points. The curves show close the similarity of the paraffines, olefines and cyclonaphthenes, which represent the major proportion of the Constituents of Present Gasoline.

which the values given are based upon the relation of molecular weight to boiling point of the olefines between temperatures of 150 and 300 degrees Fahrenheit. The pressure scale at the left and the set of horizontal lines give the partial-pressure of the hydrocarbon vapor for any mixture-ratio between 10 and 20 to 1 and any avreage boiling point from 150 to 300 degrees Fahrenheit. The pressure scale at the top of Figure 6 and the vertically inclined lines reduce the partial-pressure of the hydrocarbon vapor from that of a total pressure of 29.92 inches of mercury to that of manifold depressions from 0 to 22 inches of mercury.

For the purpose of estimating the effect of reduced pressure on the boiling points of hydrocarbons, the approximate relation suggested by Walker has been used, that is, that the ratio of the boiling points on the absolute temperature scale of one compound at two pressures is the same as that of a second compound of the same structural series. This relation, based on published vapor-pressure data for the paraffin series, has been plotted in Figure 7. Unfortunately, lack of time has prevented any experimental check on the accuracy of this method of estimating the effect of greatly reduced pressures on the boiling points at atmospheric pressure. The "temperature factor" given in Figure 7 is the ratio of the absolute boiling point at the given pressure to the absolute boiling point at atmospheric pressure.

Pressure-Conversion Chart

The use of Figures 6 and 7 can be illustrated by an example. Assume gasoline A in Figure 3, whose average boiling point temperature of 50 per cent bottoms is 240 degrees Fahrenheit. With a mixture ratio of 12 to 1 and a manifold depression of 2.00 inches of mercury, the hydrocarbon vapor pressure in the manifold will be 0.67 inches of mercury, as determined from the horizontal line and the scale at the left of Figure 6. This pressure becomes 0.62 inches of mercury when reduced to 2.00-inch manifold depression by following the horizontal line of 0.67 inches to its intersection with the vertically inclined line for 2.00-inch manifold pressure and reading the hydrocarbon pressure on the upper pressure scale. The temperature of zero bottoms for this gasoline is 320 degrees Fahrenheit, or 780 degrees absolute (320+460 degrees.) The temperature factor, from Figure 7, is 0.757 at 0.62-inch pressure, and the absolute temperature is $0.757 \times 780 = 591$ degrees absolute. The manifold temperature required for complete vaporization under these conditions is therefore estimated to be 591—460=131 degrees Fahrenheit. This fuel should, therefore, produce relatively little crank case oil dilution at engine temperature above 130 degrees Fahrenheit.

Estimating Temperature Required

To estimate the starting characteristics of this fuel, the temperatures giving the higher percentage of bottoms should be considered. The average boiling point of the first 20 per cent of gasoline A to be vaporized, the temperature of 90 per cent bottoms, is 175 degrees Fahrenheit. A liquid fuel mixture ratio of four to one supplied by the carbureter will, with 20 per cent vaporization, give a fuel vapor air mixture raito of 20 to 1. Gasoline air mixtures of this ratio are at about the limit of explosibility. Assuming a manifold depression of 10.00 in. of mercury during cracking, the actual hydrocarbon value pressure in the engine manifold

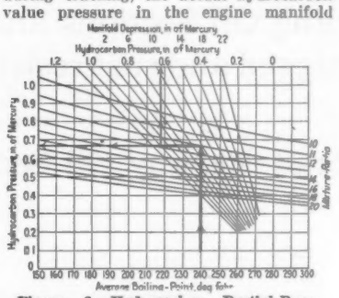

Manifold Depression, in. of Mercury
Hydrocarbon Pressure, in. of Mercury
Hydrocarbon Pressure, in. of Mercury
Mixture Ratio
Average Boiling-Point, deg. Fahr.

Figure 6.—Hydrocarbon Partial-Pressure at Different Mixture-Ratios and Manifold Pressure. Values given are based upon relation of molecular weight to boiling point of the olefines at temperatures from 150 to 300 degrees Fahrenheit. The scale at the left and the horizontally inclined lines give the partial pressure of the vapor. The scale at the top and the vertically inclined lines reduce the partial pressure from a total pressure of 29.92 inch of mercury to that of manifold pressure at depressions from zero to 22.00 inch of mercury.

will be 0.33 in. of mercury, as indicated in Figure 6. The temperature at which 20 per cent of gasoline A will be vaporized at atmospheric pressure is 190 degrees Fahrenheit, or 650 degrees absolute, as shown in Figure 3. The temperature factor for 0.33 in. of mercury and a material having a boiling point

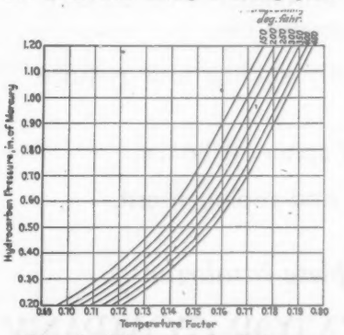


Figure 7.—Effect of Reduced Pressure on Boiling Point. Values given are based upon published vapor-pressure data for the paraffin series. "Temperature Factor" is the ratio of the absolute boiling point at given pressure to absolute boiling point at atmospheric pressure.

of 190 degrees Fahrenheit is 0.719, in Figure 7. The temperature necessary for 20 per cent vaporization of gasoline A at a manifold depression of 10 in. if mercury is therefore estimated to be (650×0.719)—460=467—460=7 degrees Fahrenheit.

The nature of the continuous distillation test, looked at from the point of view of the producer of gasoline in the refinery, is such as to suggest the possibility that the temperature which leaves zero bottoms would be nearly the same as the vapor temperature of a continuous still, provided the liquid entrainments were negligible and the vapor stream were free from steam. This might be true whether or not the vapor stream were passed through fractionating equipment. As a partial test of this possibility, two gasolines were distilled in a small still fitted with a bubble tower. One cut was made at a tower temperature of 300 degrees Fahrenheit and the other at 350 degrees Fahrenheit. The results of a continuous distillation test of these gasolines are shown in the upper two curves of Figure 8. It will be noted that the temperatures of zero bottoms are 322 and 375 degrees Fahrenheit, respectively. As the cuts were made direct from crude oil that contained about 1 per cent of water, the presence of steam in the vapor stream from the tower reduced the partial pressure of the hydrocarbon vapor. Measuring the percentage of water in the overhead and computing the partial pressure of the gasoline, the temperatures of zero bottoms become 297 and 352 degrees Fahrenheit, respectively. This result may be considered a fair confirmation of the surmise that the overhead temperature of a fractionated vapor stream will correspond closely with the temperature of zero bottoms when the tower stream is free from steam and liquid entrainment, and also that the effect of steam can be corrected with reasonable accuracy.

Temperature and Bottom Percentage

In an endeavor to obtain more information on the apparently linear relation between temperature and percentage of bottoms, a blend of equal volumes of zenzol, xylol and toluol was made. The results are shown in Figure 8, which indi-

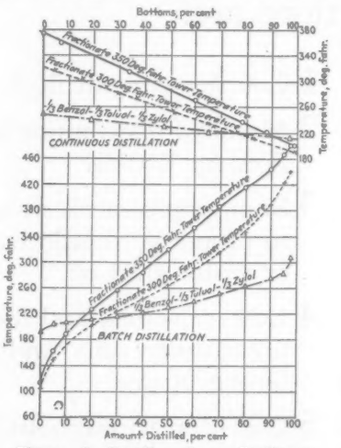

Bottoms, per cent
Fractionate 320 Deg. Fahr. Tower Temperature
Fractionate 300 Deg. Fahr. Tower Temperature
⅓ Benzol- ⅓ Toluol- ⅓ Xylol
CONTINUOUS DISTILLATION
Fractionate 350 Deg. Fahr. Tower Temperature
Fractionate 300 Deg. Fahr. Tower Temperature
⅓ Benzol- ⅓ Toluol- ⅓ Xylol
BATCH DISTILLATION
Temperature, deg. Fahr.
Amount Distilled, per cent

Figure 8.—Results of a Continuous Distillation. One cut was made at a tower temperature of 300 degrees Fahrenheit and the other at 350 degrees Fahrenheit.

cates that the fractionation in the continuous distillation apparatus is practically negligible. This lack of fractionation may explain the approximate linear relations found with gasoline and like materials.

The effect of blending is illustrated in Figures 4 and 9. It will be noted by the second curve from the top in Figure 4 that the 50 per cent point of the blend is the weighted mean of the 50 per cent points of the blended materials, and it will also be noted by Figure 9 that, in the case of blends of domestic and absorption gasolines, simple arithmetical calculations will give the blended curve from the two blended materials. The temperature of 0 per cent bottoms of the 10 per cent kerosene and 90 per cent absorption blend can be computed from the 0 per cent bottoms temperature of the kerosene curve reduced by partial pressure of the vapor of the whole of the absorption gasoline. The ready determination of two or three points on a blended curve from the curves of the blended materials combined with the very approximate straightness of the lines, makes the estimation of the volatility of the blends comparatively easy.

Volatility characteristics of a kerosene, as indicated by the continuous distillation method, are also shown in Figure 9. The distillation range is less than in the batch distillation and the line is approximately straight, as in the case of the gasoline.

Despite the very limited amount of data obtained from this method of distillation in the brief time available for this work, it is believed that simple distillation methods for the laboratory testing of gasoline should receive serious consideration, and it is hoped that further work will be done to make the translation of boiling points from atmospheric pressure to lower temperatures sufficiently accurate for

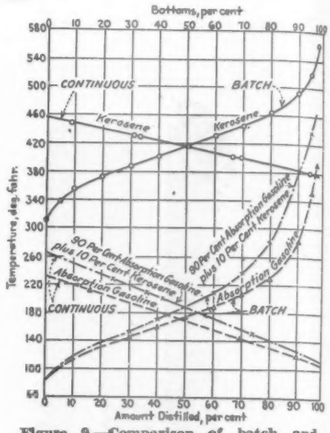


Figure 9.—Comparison of batch and continuous methods with kerosene and blends.

practical purposes. It is my opinion that the use of continuous distillation methods should give rise to the development of a definition of gasoline volatility that will be more acceptable to both producer and user than those now in vogue.

I desire to express herein my great appreciation for the support and encouragement given to this work by A. C. Maclaughlin and C. W. Stratford.

LARGE ATTENDANCE AT BUSINESS SESSIONS

(Continued from Page 73)

chanan, vice president of the Chestnut & Smith Corp., Tulsa, as chairman of the nominating committee. Other members appointed were J. M. Hall, manager of the Oil State Gasoline Co. and A. J. Schlosser, superintendent of the natural gasoline department of the Barnsdall Oil Co., Tulsa. It was not expected Wednesday that any changes would be made in the officers of the association. Westcott & Greis were hosts at a lunch held Wednesday noon at the Hotel Mayo.

WELL NEAR GROESBECK, TEXAS, HAS OIL SHOWING

MEXIA, Tex., May 4.—Showing of oil in the Pure Oil Co.'s No. 1 Stockton, Varella Survey, 3 miles from Groesbeck, slightly to the north and west from that place, has excited operators throughout the east central Texas fault zone. The showing was obtained at Woodbine sand levels.

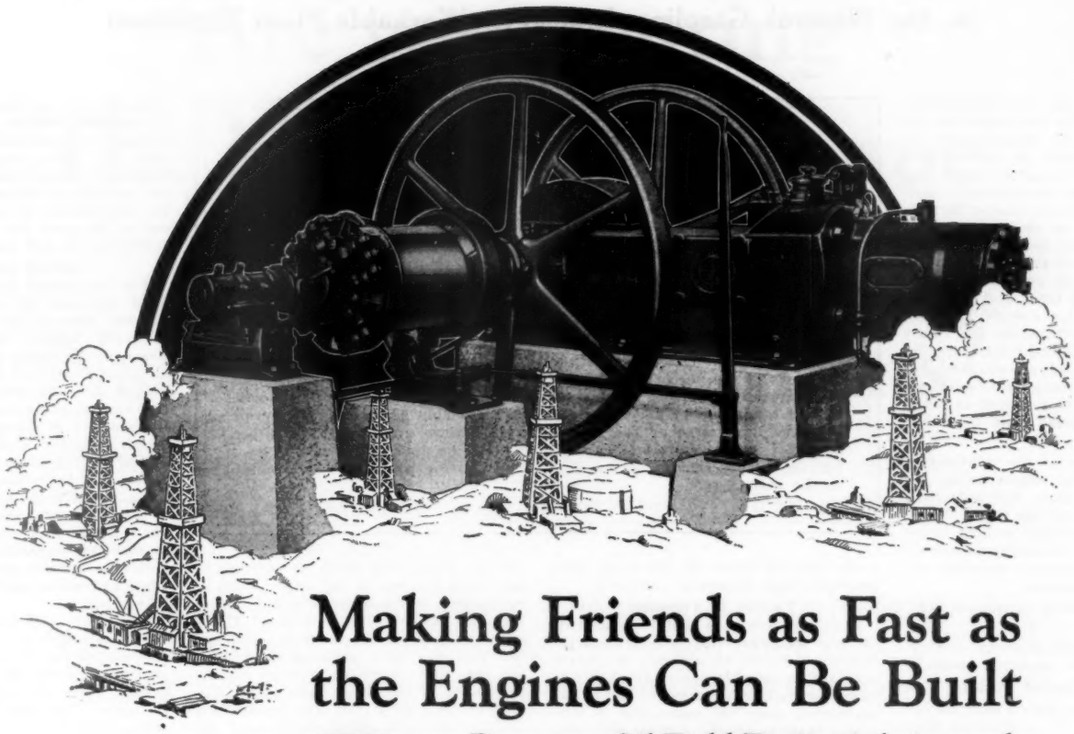
The well was closed in by the Pure Oil Co. as a gasser last October at 3,125 feet. Later the hole was re-entered with tools to deepen to complete as a gas well and was found with oil shale in the hole. It was then drilled deeper to 3,140 feet, when it began making heads Monday, continuing its performance Tuesday morning.

The oil made in the new test is estimated at about 39 gravity.

LISBON CRUDE SCHEDULE

SHREVEPORT, La., May 5.—Effective this date, the Standard Oil Co. of Louisiana posted the following price schedule covering El Dorado crude in order to take care of the oil from the Lisbon Field which is classified under the El Dorado postings:

Below 33 degrees	$1.75
33 to 34.9 degrees	1.85
35 to 36.9 degrees	1.95
37 degrees and above	2.05



Making Friends as Fast as the Engines Can Be Built

THE new Bessemer Oil Field Engine is being welcomed everywhere! It's making friends as rapidly as we can make the engines—but it's an engine that can't help being popular. THIS NEW BESSEMER IS THE GREATEST STRIDE IN OIL FIELD ENGINE DESIGN IN THE LAST DECADE—an engine for hard oil country service that has all the features of the finest commercial gas engine.

Typical Bessemer construction assures rugged serviceability. It will stand up under the hardest kind of usage. It is simple, yet includes more improved features than any other engine. It is an Oil Field Engine de luxe that only Bessemer's huge plant facilities can make possible at such a low cost.

Here are a few of the construction features.

Entirely Enclosed.
Combination force feed and splash lubrication.
Air valve on top of bed plate.
Entire front of cylinder head removable.
Removable plates on either side of cylinder permit quick, easy access to water jacket space.
Larger exhaust (6 in. on 30 and 35 H. P. sizes).
Outside bolting of cylinder to bed plate.
Bored crosshead with adjustable shoes.
Crankshaft perfectly balanced with counterweights.
Adjustable and removable main bearings.

Send for the specifications and construction details of the new Bessemer Oil Field Engine. You will be quickly convinced that it is far and away the finest of all oil field engines.

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BESSEMER OIL FIELD ENGINES – COMPRESSORS VACUUM PUMPS – ROLLER PUMPING POWERS

Depreciation at Gasoline Plants

Both Manufacturing and Exploiting Phases Must Be Considered in the Natural Gasoline Industry. Workable Plant Explained

By A. B. Morris*
Appraisal Engineer, Chestnut & Smith Corp.

For many people, the ideas embodied in the words depreciation and depletion are somewhat shrouded in mystery, due to some extent, no doubt, to the weighty sound of the words themselves, which has discouraged a closer examination into what they mean. There is another formidable word related to these two much as the surname of two brothers is related to the given name of each, and that is amortization. Strictly speaking, amortization is the general term, and depreciation and depletion are specific kinds of amortization. Unfortunately for clearness, custom has attached certain specific meanings to the word amortization, so that for many its generic nature is lost, and it has come to be regarded as something basically different from the other two specifics.

A brief discussion of the relationship of these three words—amortization, depreciation and depletion, will help to a better understanding of this topic. When money is put into a profit seeking enterprise, it is generally impossible to recover anything like the amount expended except through two courses:

1. Sale of the venture to another operator, or

2. Operation of the property and recovery of cost out of operating profits.

Recovering Capital Outlay

In the first case we have a mere change of ownership, and the new owner then stands in the shoes of the original one and like him is under the necessity of recovering his capital outlay in either of the same two ways. Ultimately someone will have to resort to course No. 2 to recover the cost if it is to be recovered at all.

Everyone knows what "operating profit" is. This term designates the margin between sales or other income from operation, and the cost, other than capital outlay, necessary to produce the income. If these profits are all paid out in dividends or otherwise withdrawn from the business and the time arrives when, for one reason or another, the abandonment of the venture becomes necessary, there will remain nothing out of which to pay back the investors except the junk value of the property. They will have put their money into the business and derived dividends therefrom which has eaten up their capital. They had a right to assume that the dividends represented true profits, whereas each payment included not only true profits, if any, but also a portion of their original investment. The company has lived upon its substance, and is in exactly the same position, economically, as a legatee who cuts into the principal of his estate for his current living expenses. The company has been thriftless.

In mercantile enterprises the value of the plant is small in proportion to the income expected and the total volume of business transacted and in addition is generally readily salvageable at nearly original cost; but in manufacturing and exploitation enterprises the plant cost is very large and the plant itself is of such a nature as to be salvageable only at a very large discount, regardless of its actual condition. In both mercantile and manufacturing enterprises the continuation of profits is very closely related to the individual efforts of those concerned; but in exploitation enterprises, the continuation of profits is primarily dependent upon the length of life of the resource being exploited. The natural gasoline industry is both a manufacturing and exploiting industry and is subject not alone to the laws of either one, but to the laws governing both classes of endeavor.

Factors to Consider

It is apparent then that from mercantile and manufacturing undertakings the return of capital outlay may be spread over any reasonable period of time governed generally by the useful life of the equipment, since the assumption is warranted that the efforts of those concerned and hence the life of the business will be sustained beyond that period, indefinitely. Where the life of the business is limited by the supply of raw material, however, it becomes necessary to assure the complete return of capital prior to the exhaustion of the supply.

Amortization, an accounting process, is the means by which this savings out of operating profits is accomplished. The portion of the amortization deductions held out of operating profits to return the cost of physical equipment is called depreciation; that portion which is held out to return the cost of securing the necessary supply of raw material is called depletion. If money has been borrowed to start the business and sinking fund payments are also deducted to retire or amortize—this debt, such deductions are known as amortization, in this case used specifically. There are other specific meanings for amortization, which will not be touched upon here.

Strictly speaking, these terms are accounting terms used in abbreviation of the more complete "deduction for depreciation" and "deduction for depletion." The actual depreciation takes place not on the books but in the physical property itself, through wear and tear, obsolescence, or market changes in equipment prices; and the actual depletion takes place in the supply of raw material as it is withdrawn for use, or depleted.

Bearing in mind the sole purpose of making these deductions from operating profits before computing true profits—these sinking fund payments to retire the original cost prior to the abandonment of the venture—let us consider the various ways in which this is actually accomplished in practice, by gasoline manufacturers.

Depreciation

The simplest method and the one most generally in use is the so-called "straight line" method. This consists of adopting some percentage rate, chosen more or less arbitrarily and applying this to the investment figure each year, the product of the two being the amount to be deducted to provide for the retirement of capital cost of equipment. Thus if it is assumed that eight years is as long as the gas supply can safely be expected to last, 12½ per cent of the original cost of equipment saved each year will retire the total at the end of that time. If the operations extend beyond that point, and the rate has been maintained at 12½ per cent throughout the point is reached at the end of the eighth year when these savings—this thrift pile, the depreciation reserve, as it is called—will equal the total investment, provided, of course, that there have been no additions to plant in the meantime. Thereafter, it being unnecessary to save anything further from current earnings on this account, deductions for depreciation cease, or become limited only to the return of the cost of subsequent additions. The plant is said to be "depreciated out." It may or may not have "paid out" long before. On the other hand if the plant has to be abandoned at the end of the fourth year only half of the cost will have been returned and the balance remain as an almost valueless asset.

The ease with which such a depreciation reserve is handled, coupled with the fact that this method prevails generally in all other businesses, have led accountants generally to prefer it under nearly all conditions. In a business such as this, however, the choosing of the proper rate of depreciation is so highly problematical, so much open to question on theoretical grounds, and so likely to prove incorrect, once having been decided upon, that some operators are now turning toward another method of saving up their plant cost out of earnings, where the amount saved each year will bear a direct relation both to the volume of business done and to the remaining supply of raw material upon the existence of which the continued operation of their plant depends.

This consists of making an estimate from all available data, of the ultimate production of the plant, that is, the total number of gallons of gasoline which is believed will be made before such time as operating profits shall cease to exist. Enough information can be had to make a reasonably accurate estimate of this kind for all except entirely new fields. Such an estimate should be computed by leases or other readily identifiable groups, and after a year or two of operation, can be adjusted up or down as may be indicated by the additional data thus provided. The total of these estimates is then divided into the total investment account—or the total less an estimated salvage value not to exceed 20 per cent—and the quotient, called the unit of depreciation applied to each gallon of gasoline as it is produced. If depreciation is computed monthly, the monthly deductions can be computed on a continuous sheet or table, which will show any changes in the investment account and in the estimate of ultimate production. If the depreciation is computed only at the end of the year, the depreciation unit is applied to the full year's production.

Several Advantages

The advantages in this method in my mind outweigh the objection of the additional labor of estimating and revising reserves. Besides affording a distribution over the entire life of the project of all plant cost, and assuring the return of the full cost prior to abandonment, this method keeps the management at all times aware of the conditions of the gas supply, whether it is in danger of early dissipation, or adequate to maintain production at approximately present levels for a considerable period. The estimate of production will show at what rate new gas will have to be contracted for in order to maintain capacity operation; and indicates a considerable time in advance, when and where such efforts will have to be exerted.

For large concerns such estimates should be prepared entirely independently of their use for depreciation or depletion purposes. After they are once started, keeping them up to date requires but little labor. The small concern having but one or two plants, where no engineering staff is maintained, can have these made by outside engineers at relatively small cost, and can have them revised once each year, which would be often enough.

Analyzing Depreciation

Regardless of the method of computing depreciation, what items of plant cost should enter into the computation? What part of the original investment in plant is it necessary to save up to pay for? A finished plant consists of machinery, building material, pipe, masonry and labor. Labor includes ditching for pipe lines and all teaming costs and masonry includes concrete foundations and pits. When the gas supply is exhausted and it becomes necessary to abandon the plant what can be salvaged?

Machinery, pipe and building materials are all that have any value at all. The labor of erecting and installing is lost, and except for that part of it which went into concrete work, will very nearly have to be duplicated in order to dismantle the plant. Masonry is worthless. Second-hand building materials have a value not much in excess of 20 per cent of cost of new; and machinery and pipe have a value largely dependent upon their condition and the state of the second-hand market at the place and time of reclaim. The saving for depreciation must therefore cover the following items: Not less than 60 per cent of pipe cost, not less than 70 per cent of machinery, not less than 80 per cent of building materials, not less than 100 per cent of masonry, not less than 170 per cent of all labor and teaming.

Or if the plant were built on a contract, or purchased in operation, so that the above distribution could not be made, not less than 80 per cent of the entire cost of the plant. These ratios, when applied to the investment figures for five plants, closely approximate 80 per cent of the total cost of the plants. However, I have seen no actual figures to support this 20 per cent net salvage value.

Example

An interesting example of the handling of depreciation is the following related by a member of this association. The

(Continued on Page 138)

FACTORS TO BE CONSIDERED

If some method of plant appraisal which took into consideration the operation of fixed charges were resorted to by everyone contemplating the construction or purchase of a plant, there would be far fewer dazzled by the size of the gross operating revenue, and there would be far fewer disasters in the industry, the cost of which falls on the survivors and on the public. Gasoline production can never properly be quoted at a flat rate per gallon. Instead its value is inseparably connected to the life of the gas supply and to the conditions of the gas contracts.

Also capital charges, such as depreciation and depletion, are direct functions of the purchase price paid for the property and have no definite or universally applicable value either as to amount or rate. Under present market conditions, or under any that can reasonably be expected to prevail over the next three or four years' period, values approaching $100 per gallon of current daily production could rarely be paid without far exceeding the 10 per cent of selling price limitation for bonus cost of gasoline in the well.

*Fifth annual convention, Association of Natural Gasoline Manufacturers Association, Tulsa, May 5 and 6.

Are you securing The Maximum Revenue from your Natural Gasoline Plants?

THE USE of The Gasoline Stabilizer assures increased production and improved quality at very low cost to the producer.

The proper equipment for your individual plant is determined by our engineers—without cost to you. They also determine the approximate increased production which will result from the use of the Stabilizer.

The Carbide and Carbon Chemicals Corporation maintains a complete field organization—Sales, Engineering and Laboratory—in the Mid-Continent Field and upon the Pacific Coast. These representatives will gladly consult with you about the use of The Gasoline Stabilizer and the merits of stabilized gasoline.

Information about the satisfactory performance of the Stabilizers now in operation and the probable increased revenue from your particular gasoline plant will be promptly furnished.

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San Francisco, California

Interdependence of the Oil Industry

W. R. Boyd, of American Petroleum Institute, Tells Natural Gasoline Manufacturers of "E Pluribus Unum" Spirit

By W. R. Boyd, Jr.*
Assistant General Secretary and Counsel, American Petroleum Institute

My inspiration for this talk came from reading the editorial which appeared in the March 26 issue of The Oil and Gas Journal. There the editor tells us that "our 48 states, each busy with its own affairs and each solving its own problems in its own way, welcome information and cooperation from each of the others and, united, they take council and act together on matters of common moment."

"E Pluribus Unum," says the editorial, "is just as sound for an industry or for a business as it is for the nation." We are reminded that "some of the most revolutionary influences, in the sense of changing or reversing accepted notions and customs, have been worked out (within the oil industry itself) by almost unnoticed evolution rather than by any epochal act or event." We are told that "men engaged in the same line have discovered that the competition that pays best is the competition of efficiency, not mere price cutting, and that they can learn from the other fellow and let him learn from them and still compete successfully in management."

W. R. Boyd, Jr.

How true this is! And, one could even add how astonishingly widespread has been the diffusion of this "E Pluribus Unum" idea in the petroleum industry within a few short years. The institute, your own and other cooperative instrumentalities have sprung into existence and flourished with increasing vigor. By their fruits ye shall know them!

Almost Silent Changes

What are some of the almost silent changes that have taken place in our industry concurrently with the growth of these cooperative instrumentalities? In the petroleum era which preceded the war it is pretty generally understood that, by and large, most of the men engaged in the oil business belonged to the "isolation" school of thought. It was every fellow for himself and the devil catch the last one. But, "through the ages an increasing purpose runs!" Impelled by the necessities of war and inspired by patriotism, competitors, each able and each powerful in his own sphere, under the persuasive leadership of a mighty man, were allied together in a common cause! Authoritative and outstanding representatives of large and competitive business interests faced each other for the first time across the table. Business intelligence met there, drew designs upon the trestle board and merged individual into industry policies. Then a new chapter was started in the history of petroleum. Thenceforth, the petroleum industry, consciously or otherwise, began a process of educating itself to live with itself instead of committing industrial suicide.

Here are some of the outstanding and perfectly normal consequences of the fermentation of the "E Pluribus Unum" idea. There has come a universal recognition and acceptance of the doctrine of the interdependence of the several branches of this industry. Gradually, but surely, hostility, suspicion and distrust are being eliminated. The old vague and formless notion about monopolistic control has been shattered. Oil men, everywhere, now know and they are telling it, that the only force which can dominate prices for petroleum and its products is economic law.

In our new industrial era the thoughts of oil men have been dragged out into the open. The storehouse of common knowledge has been opened to inspection. It has been demonstrated that our industry, as a "nation" and as "states," to use the simile of the editorial referred to, has come to realize, as most of the other basic industries did long before, that collective thinking can be made straighter and sounder than individual thinking because, in thinking out loud, facts, figures and experiences outside of any one man's immediate business will inevitably be uncovered. In determining industry and company policies, managements want to reach decisions that are sound. No business policy can be sound unless it contributes something constructive to successful and permanent business. Principles are unchanging, but no business policy is ever final; for just around the corner may be lurking some hidden fact or undiscovered condition that will compel its revision.

Advantages of Cooperation

We know there is no such thing as infallibility in buiness management. We know that success sometimes does come from accidents or favors or hunches. But, the rule is that it comes only through hard work, straight thinking, courage to experiment and ability to profit from mistakes—mistakes not alone of one's own making but also of the other fellow's making. One of the best known methods of avoiding many costly "trial-and-error" processes is to pool, openly, experience not forbidden by company necessities in cooperatively operated instrumentalities.

The oil industry learned much from the cooperate experiences of many other industries. We knew in advance that men engaged in the same industry could differ in opinion and in experience and still cooperate. We could see these differences selected in company policies. We knew from the experience of others that there would always be conflicts of judgment and the friction of competition. We, ourselves, have seen the leadership, and the rank and file, of the oil industry come to appreciate that, if possible, it is better always to settle issues and cut down friction inside the industry itself; recognizing that unless harmonious relations can be maintained within an industry, sooner or later the general public may take sides and demand some form of government interference. We learned there could never be arbitrary decisions made nor autocratic standards set up within a trade association. We were told, and we have found it to be true, that no policy ever became an industry's policy unless and until it was concurred in by general agreement or common acquiescence.

The blunders and unfortunate experiences of some other industries indicated some of the pitfalls we should avoid. From the very outset of our industry's cooperative work, we scrupulously avoided using any of our numerous trade associations as cloaks to shield unlawful combinations, open price agreements or any violation of the Sherman law or the Clayton act. Neither large nor small units of the industry are today party to any agreements, express or implied, looking either to the direct fixing of prices; or to fixing or regulating the volume of production so as to affect prices; or to the apportionment of marketing territory, or to any understandings, private or public, to restrain trade, crush and destroy competitors or curtail the freedom of competition.

Competition in Industry

The greatest asset of the oil industry is the competition which exists. Investigations during very recent years, under authoritative agencies of government, have always established the existence of competition and disproved charges of secret agreements. Our trade associations need no defense on this score because their policy is well and widely known. I have attended every meeting of the American Petroleum Institute's board of directors during the past five years. Not once has there ever been proposed, much less discussed, anything which in any manner related to an agreement to fix or control the price of crude oil or any of the refined products. Under the law of probabilities and under the present management and directorate it takes neither a wise man nor a prophet to see that no other policy could ever be pursued. Any attempt to fix prices by agreement through any trade association would, in my judgment, instantly be denounced by the industry and the only definite thing such an attempt could accomplish would be the prompt dissolution of the association which had the temerity to try it.

There is no royal road to success in this business. Every tub must stand on its bottom. The oil man of today is proving his claim to survival by surviving. In this fierce industrial democracy of ours, the law of selection rapidly weeds out the unfit. Since the invention of the internal combustion engine our industry has grown by leaps and bounds. Coincident with its expandsion has grown also the imperative need for men of superior execution, administrative and technical ability. The record is filled with conspicuous instances where men, displaying managerial or technical talent of a higher order, have been rapidly advanced to places of responsibility and discretion. This condition has attracted to the industry many able men from other industries, men who have grown into business manhood in an environment of cooperative work. This infusion of new blood has encouraged the development and stimulated the spread of the cooperative spirit. By and large, all of this has given us a new sense of industrial solidarity which is finding expression in a hundred different ways.

Function of Association

Your association is supported by that part of what we call "the oil industry" engaged in the production and wholesale distribution of natural gasoline. Your function is to deal, primarily, with the intimate and detailed problems related to the business of your particular constituency. Secondarily, you make your constructive contribution to the welfare of the whole oil industry of which you are an integral part. Most of the time you will find, but occasionally you will not, that it is to your distinct economic advantage to make the whole industry's problems your problems. Because of the oscillation of economic self-interest, the divisions or branches of the industry create and support separate associations. In numerous instances these associations are supported actively by men or companies interested in more than one division or branch of the industry. In my judgment, there are sharp but natural lines of clevage between the respective divisions of any industry like ours which not only justify but make it desirable to have and necessary to maintain different instrumentalities for self-expression.

Much of the work which your association does and which the other representative associations do, is of a character applicable only to the business fortunes of the association's particular constituency. Much of that sort of work can not be done so successfully, if needed it can't be done at all, by any other existing instrumentality. Quite frankly, I do not hesitate to include the Institute among the "other existing instrumentalities." The Institute's function is to deal only with such problems as affect the over-all welfare or economic interest of the entire petroleum industry. It is understood that the Institute has its limitations as to jurisdiction; that it cannot function where and when there is conflict of interest between branches of geographical sections of the industry.

Position of Institute

The Institute has assisted freely many of the other associations in the working out of particular problems. In so doing it has served all. Conversely, the respective oil trade associations have often times assisted the Institute in the working out of some problems it was handling. By so doing a constructive service was rendered to the constituency of the cooperating association. There are numerous instances of such reciprocal work between the Institute and your own association.

What of oil association future? When the panorama of changing events of the past few years is analyzed dispassionately it cannot be illogical to assume that the cooperative idea will have fully justified all the faith which the oil men of our day have had. Add to the past deeds of real accomplishment the unsolved problems which our prophetic leaders see just ahead. The urge of sound judgment must persuade the men of and in the industry that industrial solidarity is the mainstay of the industry's progress and that this solidarity can be perpetuated only through the maintenance of effective cooperative instrumentalities which we call "trade associations."

Some leading oil men prophesy a new oil aren which they think may recast much of the structure of the business as we now know it. I am not a leader. I am not a prophet. I have been listening to the discussions that have been going on. I have been hearing the prophesies of those who prophesy. In my judgment, whenever fundamental changes do come in the oil business, they will be merely the result of compelling events, of some economic force. They will come as an orderly development, an evolution. The pressure of business competition and of business necessity will get in its irresistible work. In order to succeed, indeed in order to survive, management will then be compelled to readjust itself to meet the new problems as they arise. All else can be but by-products and ephemeral.

Where Danger May Lie.

All the evidence is that genuine distribution and consumption of refined petroleum products continues to surpass precedent. Therein may lie danger. We are geared up to refine more products than we

(Continued on Page 138)

*Association of Natural Gasoline Manufacturers, Tulsa, Okla., May 5.

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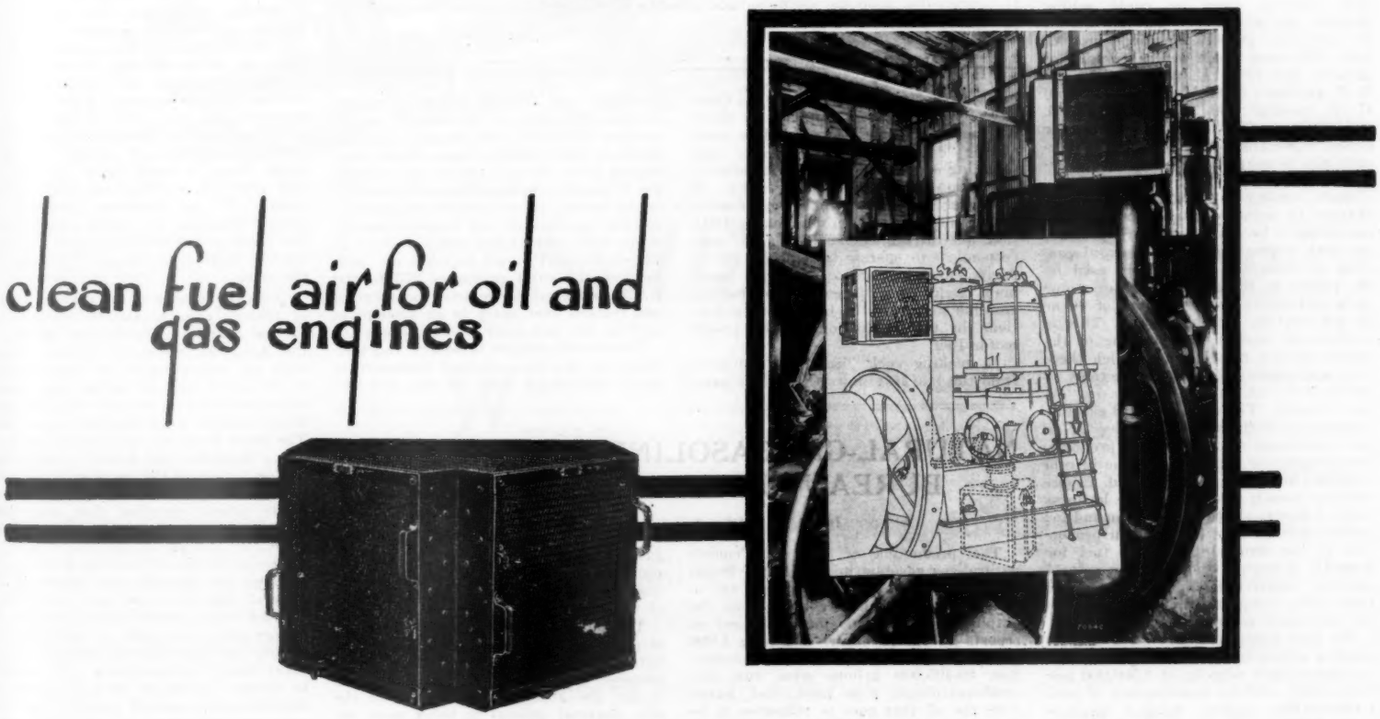

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Economic Value of Natural Gasoline

Product Responsible for 15 to 20 Per Cent of Total Motor Fuel Supply. Demand Will Continue to Increase

By E. R. Lederer*
Vice President, Texas Pacific Coal & Oil Co.

The economic value of natural gasoline to the refiner and to the consumer of motor fuel is extremely important. The enormous increase in the demand for gasoline during the last decade had to be met by the use of heavier fractions from the crude and by the rapid development of cracking processes. The products from both of these operations require a great percentage of natural gasoline to supply the necessary lower boiling fractions to blend them into a satisfactory motor fuel and meet the present specifications for U. S. Motor gasoline.

The ever increasing demand for motor fuel can be met—considering the continual decline of available light gravity crude with a large content of natural or straight run gasoline—only by installation of more and more cracking units, in order to convert heavy crudes or the heavier residues or fuel oil into gasoline. As long as this condition exists the manufacture of natural gasoline will be an important factor in the petroleum industry. In these days of close margins of profit the refiner can sell his light fractions to better advantage blended with a certain percentage of natural gasoline, than he could selling straight run or cracked gasoline alone; he can—by proper blending—produce from the same crude several grades of gasoline like 56-58 U. S. Motor or 450 E. P. gasoline; 58-60 U. S. Motor or 450 E. P. gasoline; 60-62 grade or 64-66, and 68-70 or 70-72 gasoline, the latter grades especially for export, which permits him to adapt his production to market conditions.

Such variety of grades and quick changes in refinery operations would be impossible if he could not revert to blending with natural gasoline. Natural gasoline is, therefore, very widely used by the refiner in the manufacture of motor fuels and enters to the amount of 40 or 50 per cent in certain blends. This is particularly true in the blending of the lighter gravity gasolines for which there is a large demand in certain sections of the country, and also an increasing export demand. The use of natural gasoline is essential to the refiner in order to obtain maximum returns for his products. The demand for high test gasoline in cold weather for both domestic and export business usually offers profitable business to the refinery. Naturally the demand for natural gasoline has increased in proportion to the demand for motor fuel for domestic or export trade and the natural gasoline industry has grown in a few years from comparative insignificance to an important economic factor.

We have today probably 1,200 natural gasoline plants in the United States, with an approximate capacity of 4,500,000 gallons a day, and the consumption of over 1,100,000,000 gallons natural gasoline during 1925 proves clearly the value and demand for this product.

Statistics of the Bureau of Mines for 1925 show that the demand for motor gasoline was met as follows: Straight run gasoline, 67 per cent; cracked gasoline, 26 per cent; natural gasoline, 7 per cent. This figure of "7 per cent of the entire gasoline production of the country" might at first look small; however, it does not represent the relative importance of this product to the refining industry. Doctor Burrell states in his recent book that "natural gasoline makes satisfactory for motor fuel a quantity of gasoline equal to at least 20 per cent of the motor fuel of the country."

Effect of Cracking

Recently we have heard quite a bit of discussion about the possibility that increased cracking would decrease the quantity of natural gasoline needed for blending and that "light" cuts could be made off the "crackers" if the necessary fractionating equipment would be installed in connection with the cracking units. It is entirely possible to make specification motor fuel in a modern cracking installation, but the refiner usually finds it more economical to operate at a maximum capacity, paying more attention to maximum yields and depending on natural gasoline to supply the lower boiling fractions in the production of the proper motor fuel.

In making such "light" cuts directly from the cracking units the refiner saves probably some treating expenses, but decreases the value of the balance of the gasoline distillate. No cracking process produces light hydrocarbons of the same boiling point or of a "close cut" nature, but it produces hydrocarbons of quite different boiling points simultaneously—according to pressure and temperature applied—and the high end point products of 437 or 450 E. P. must be taken out with the low end point groups of 375 to 400 E. P.; or must be refluxed or recycled and cracked over again in an attempt to produce low end point distillates only.

This would require pressures and temperatures in excess of those necessary to crack kerosene or light gas oils, and this has so far proven impractical and uneconomical. The refiner who separates this light gasoline from the cracked gasoline distillate obtains a heavy naphtha distillate, which has to be treated heavily and rerun and separated into naphtha and gas oil. In order to convert this heavy naphtha into a marketable motor fuel he has to blend it with a much higher percentage of natural gasoline or sell the low gravity out at a sacrifice. It is clear that such a procedure in fractionation—even if of advantage in some cases to the refiner—is not reducing in the long run the total amount of natural gasoline needed for blending.

Adds to Value

Natural gasoline has had considerable and economically important influence in changing the former methods of distillation and fractionation in refinery practice. If a crude was deficient in low boiling point hydrocarbons, the gasoline cut had to be made at such temperatures that the mixture of all fractions or the resulting gasoline had the proper gravity, initial and intermediate boiling points required by existing specifications. Thus frequently 10 per cent and more of the lighter fractions or naphtha had to be sold at a lower price than gasoline. Now, with the improved type of fractionating columns the refiner can regulate his cut for the highest end point allowed by the specifications and make up for the lack of lighter hydrocarbons, by blending with natural gasoline and produce a much larger yield of good motor fuel, which will meet all specifications and requirements. It is, therefore, possible, by proper blending, to utilize and increase the value of heavier hydrocarbons which amount often from 10 to 20 per cent of the crude.

With the passing of the gravity method of grading gasoline and the substitution by the Standard Distillation Method of the American Society of Testing Materials for determination of the volatility of the motor fuel, the refiner has become more dependent on the use of natural gasoline to blend a specification motor fuel. The profit from the increase in value of heavy naphthas has helped a great deal during periods of low markets to keep the refinery going, and break even, and when better prices prevailed they were very material in producing a favorable balance sheet.

The advantage of blending with natural gasoline will become still greater if the Federal Specification Board will remove the end point specifications, leaving the 90 per cent over point as indicative for quality and limit for the inclusion of too many heavy hydrocarbons. It is easier to correct the 90 per cent over point by blending with natural gasoline than the end point and such a change would enable the refiner to increase the yield of gasoline distillate by including such heavier hydrocarbons, which by proper blending with natural gasoline could be made to meet intermediate and 90 per cent over boiling points, and produce a very desirable motor fuel. It is evident that in this case again natural gasoline will help in increasing the total amount of gasoline produced by refineries in the United States and thus meet the ever growing demand for motor fuel.

Decline of Light Crude

The steady decline of light crudes, rich in light gravity gasoline, would have been a serious handicap for the export trade, were it not for the increased supply and use of natural gasoline in blending for export specifications the distillates produced in our refineries from heavier crudes. As long as the export trade in-

(Continued on Page 142)

*Before Association of Natural Gasoline Manufacturers.

FUTURE FOR NATURAL GASOLINE

Future demand for natural gasoline should be as great as in the past. Improved fractionation and increase in the number of cracking units will require more natural gasoline to produce a satisfactory motor fuel. The use of natural gasoline in the manufacture of motor fuels not only enables the blended product to meet the necessary specifications for motor fuel, but actually makes a superior product from the consumers' standpoint, which is of economic importance to the refiner using natural gasoline in making his motor fuel superior for the market.

The low initial and lighter fractions supplied by natural gasoline aid in starting the motor. The lighter hydrocarbons being richer in hydrogen and consequently having a higher calorific value mean more power to the motor. Natural gasoline means less knocking of the engine since it has been found that the heavier paraffin hydrocarbons detonate more readily than the lighter groups.

In conclusion we may state that the economic value of natural gasoline to the refiner is of such importance that it would be very difficult under present specifications to obtain maximum returns for his products without using it. The position of natural gasoline in the petroleum industry has become well established. It not only adds very valuable constituents to the motor fuel, but enables the refiner to utilize more advantageously his heavier naphthas from the crude, thus imparting greater value to them in the preparation of specification motor fuels and also to operate his cracking units at a maximum capacity with less regard to the lower boiling fractions, depending upon the use of natural gasoline to supply this deficiency economically and efficiently.

NATURAL-GAS GASOLINE IN 1924; BUREAU OF MINES REVISED REPORT

By G. B. Richardson and E. M. Seeley*

The production of raw (unblended) natural-gas gasoline in the United States in 1924 was 933,861,000 gallons, an increase of 117,635,000 gallons over the output in 1923. This total is based on reports by 457 producers operating 1,096 plants in 13 states. Of the total production 89,495,000 gallons were run into crude-petroleum pipe lines and mixed with the oil that goes to refineries to be distilled; the remainder (excepting losses and the relatively small quantity utilized in the raw state) was blended for use as motor fuel.

Increased output was reported in all of the producing states except West Virginia, Ohio, and Kentucky, in which small losses were recorded. The greatest gain was in California, where the increase was 59,250,000 gallons, or 34 per cent. The output of the three leading states—Oklahoma, California and Texas—amounted to 77 per cent of the total production of the country.

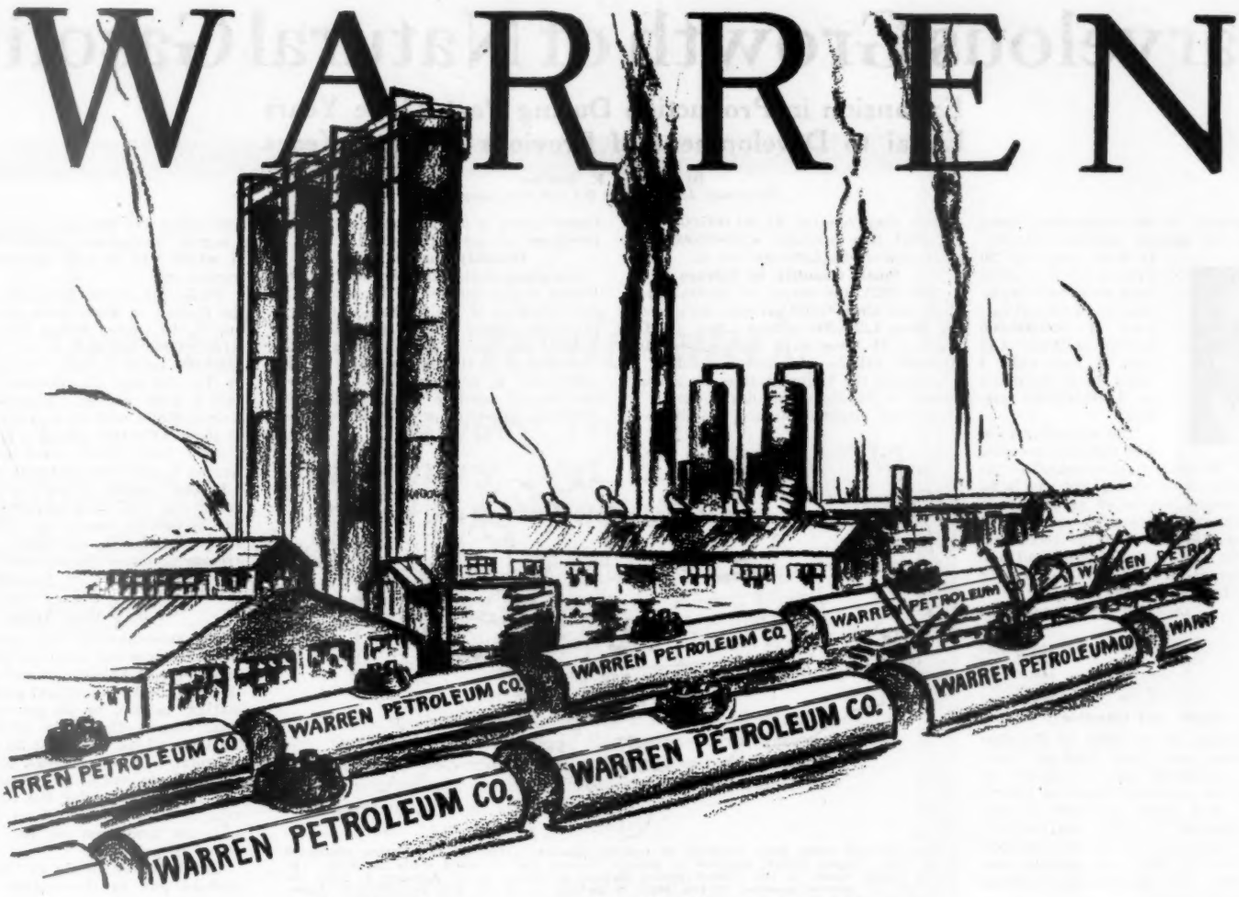
The dominating position of the industry in the states west of Mississippi River is shown by the fact that 89 per cent of the total output of natural-gas gasoline in the United States in 1924 was produced in that area, although 45 per cent of all the plants are in states east of the Mississippi.

The tendency to utilize a combination of processes for recovering gasoline from natural gas is increasing. Many compression plants have been remodeled to utilize the absorption process, and the new charcoal process is being used not only by itself but also in auxiliary plants to treat the discharge gas of plants utilizing the compression and absorption processes. The plants reported as utilizing the compression process singly (not in combination with other processes) in 1924 numbered 639; they produced 257,894,000 gallons—an average of 403,590 gallons per plant per annum. The 445 plants reported to have used the oil-absorption process, either singly or in combination with the compression or charcoal process, produced 670,678,000 gallons—an average of 1,507,142 gallons per plant per annum. Reports were received from 12 plants in which only the charcoal process was utilized; they produced 4,064,000 gallons. Five plants were reported to have utilized the charcoal process in combination with other processes in recovering gasoline from natural gas.

(Continued on Page 94)

*The Bureau of Mines preliminary report for 1925 was published in The Oil and Gas Journal of February 18 and March 11, 1926. This report complete for 1924 has just been published by the bureau.

WARREN



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Marvelous Growth of Natural Gasoline

Expansion in Production During Past Three Years Equal to Development of Previous Twenty Years

By Charles E. Bowles
Petroleum Analyst, The Oil and Gas Journal

"Expansion" is the outstanding thing today in the natural gasoline industry.

It took nearly 20 years for it to grow from an humble beginning to an annual output of 500,000,000 gallons in 1922. And then it took only 3 years for it to expand to 1,000,000,000 gallons.

The natural gasoline industry occupies a sort of "by-product relationship" to the oil industry whose casinghead gas is by far the largest source of natural gasoline. And, very naturally, one finds a striking parallel between the recent expansion in the output of crude oil and the output of natural gasoline, as the following tabulation shows:

Year—	Crude Oil Output (bbls.)	Natural Gasoline Output (gals.)
1921	472,000,000	450,000,000
1922	557,000,000	505,000,000
1923	732,000,000	816,000,000
1924	714,000,000	933,000,000
1925	756,000,000	1,105,000,000

Crude and Gasoline

The bringing in, in 1923, of the eight major fields, with their flood of "new" oil and casinghead gas, is clearly reflected in the increased output of natural gasoline. And while this new oil production "settled" in 1924—and while naturally much less new oil was produced in 1924 than in 1923—the natural gasoline industry just as naturally increased its output in 1924.

Better capacity to handle the casinghead gas, much of the great flood of which was lost in 1923, enabled the natural gasoline industry to show another gain in 1925—and to push its output over the "billion-gallons-a-year" mark.

During the past three years the tremendous increase in crude production—and its accompanying casinghead gas—has given both the oil industry and the natural gasoline industry great physical problems to solve—and, regardless of the ebb and flow of oil and gas, both industries are constantly at work on their technical problems, of the successful solution of which the public in general knows little beyond the fact that it always has "plenty of gasoline"—and about which politicians know little, and care less, that many times cheap gasoline means "red ink" to many of its makers.

Prices of Natural Gasoline

The accompanying graph is a "10-cents-a-gallon" graph—that is, when the price of gasoline averages 10 cents a gallon for the year the dotted line and the solid line meet—when the price is less than 10 cents a gallon the dotted line is below the solid line—and when it is more than 10 cents the dotted line is above the solid line.

Waiving all discussion of the "gallonage production cost" of natural gasoline—and that it does vary very widely we all know—the plain fact remains that from 1916 to 1922 inclusive, the average selling price at the plant, for the entire United States, was over 10 cents a gallon.

Many plant operators still remember the causes and conditions that are reflected by the "break" in the dotted line in 1921. In 1920, when oil in the Mid-Continent was $3.50 a barrel plus premiums, the natural gasoline manufacturers turned out 384,000,000 gallons of gasoline for which they received almost $72,000,000. In 1921, they turned out 450,000,000 gallons for which they received $62,000,000. The producers of crude oil were fellow-sufferers, for in 1920 they produced 443,000,000 bbls. of crude for which they received $1,361,000,000—and in 1921 they produced 472,000,000 bbls. and received $815,000,000 for it.

Small Quantity in Storage

For 1921, the output of natural gasoline was 450,000,000 gallons—an average of about 1,230,000 gallons a day. On December 31 there were slightly over 10,000,000 gallons of natural gasoline in storage in the United States—an amount equal to less than nine days output. In 1925, the output of natural gasoline was 1,105,000,000 gallons, an average of about 3,027,000 gallons a day—and the storage on December 31 was 13,800,000 gallons, or a little more than four days plant output.

In the matter of its natural gasoline supply, California is literally living "from hand to mouth" as there is today on the Pacific Coast practically no stock of natural gasoline—only that which is in transit between the plant and the purchaser.

The Gulf Coast oil producing and refining area is not a producer of natural gasoline, although the accompanying map shows 157 plants in Texas, and 56 in Louisiana—all are "inland" plants, far removed from what is known as the "Gulf Coast."

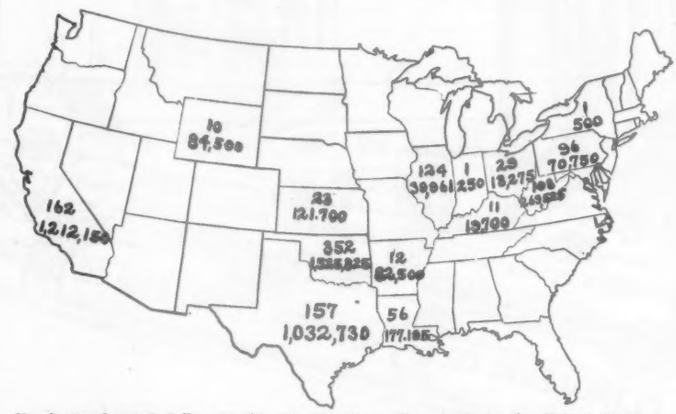
Likewise the one plant in New York and the 96 in Pennsylvania are in the western end of these States, the "East Coast" being a non-producer but a large purchaser of natural gasoline.

Quantity Run to Stills

According to the monthly reports of the United States Bureau of Mines for 1925, the refineries of the United States "ran to stills" about 722,000,000 gallons of natural gasoline as the following tabulation shows. In this connection it is most interesting to note the relation between the natural gasoline "run to stills" and the total output of gasoline at refineries, and referred to in the 1925 report of the Bureau of Mines as "blended" gasoline.

Area—	Natural Gasoline Run to Stills	Total Output Gas. at Ref'rs.
East Coast	134,022,000	1,744,120,000
Appalachian	15,204,000	426,470,000
Ind.-Ill.	43,386,000	1,461,600,000
Okla.-Kan.	116,214,000	2,015,096,100
Texas	175,350,000	2,231,485,000
Ark.-La.	24,612,000	629,819,000
Rocky Mts.	35,070,000	611,654,000
California	178,038,000	1,765,883,000
Total	721,896,000	10,886,127,000

To the foregoing 721,896,000 gallons of natural gasoline that were "run to stills" at refineries, and other forms of consumption, must be added the finished motor fuel of natural gasoline origin that, either blended or unblended, finds its way from the natural gasoline plant to the consumer, usually via the jobber, and that does not come into contact with the refining industry. The difference between the 721,890,000 gallons accounted for in refinery operations and the 1,105,000,000 gallons which was last year's total output in a largely "unexpected country" the details of which will be very interesting when worked out.



Number and rated daily capacity of natural gasoline plants in the United States as of 1925. Upper figure, number of plants. Lower figure, rated daily capacity. In the report made by the United States Bureau of Mines, as of January 1, 1926, the output of natural gasoline during 1925, in gallons by areas, was as follows: Appalachian, 94,200,000; Indiana-Illinois, 21,500,000; Oklahoma-Kansas, 403,800,000; Texas, 184,700,000; Arkansas-Louisiana, 64,800,000; Rocky Mountain, 32,700,000; California, 303,200,000; total for United States, 1,104,900,000 gallons. Dtat on map from survey made by The Oil and Gas Journal.

While the latest available figures of the Bureau of Mines show the total output of the United States for 1925 to be 1,104,900,000 gallons, or an average of 3,027,000 gallons a day, the survey made by The Oil and Gas Journal as of August 1, 1925, showed 1,143 plants in the United States with an aggregate capacity of about 4,650,000 gallons a day. Of this number, 1,043 plants were operating on August 1, with an aggregate capacity of 4,390,000 gallons a day. As the total output for 1925 was 3,027,000 gallons a day, it follows that if the operating condition August 1 represents about the average condition for the year, the plants operated at about 70 per cent of their rated capacity.

Two Main Areas

The accompanying map clearly shows that there are two great natural gasoline areas—the Mid-Continent and California. In 1925, the Mid-Continent produced 653,300,000 gallons, or 59 per cent of the total output—California produced 303,200,000 gallons, or almost 28 per cent of the total. These two areas, together, produced 87 per cent of all the natural gasoline last year, leaving the Rocky Mountain area to produce about 3 per cent and the area east of the Mississippi about 10 per cent.

One naturally thinks of "wet" or casinghead gas as the source of natural gasoline—and yet the natural gas companies, in the aggregate, are today recovering very substantial amounts of natural gasoline from dry gas. In most states carbon black plants are required to extract the gasoline from the gas before it goes to the burning houses. And while the total of the natural gasoline recovered by gas companies and carbon black manufacturers may not be a very large percentage of the total output, it is one of the many forms of conservation that are being worked out and put into practice by the oil and gas industry—and usually without a blare of trumpets.

Value of Product

The natural gasoline produced in 1925—1,104,900,000 gallons— was worth, at the plants, approximately $100,000,000. To produce the output in 1924 (933,000,000 gallons) required the treatment of 1,000,000,000,000 feet of gas—and as the output in 1925 was about 18 per cent increase over 1924, it is probable that

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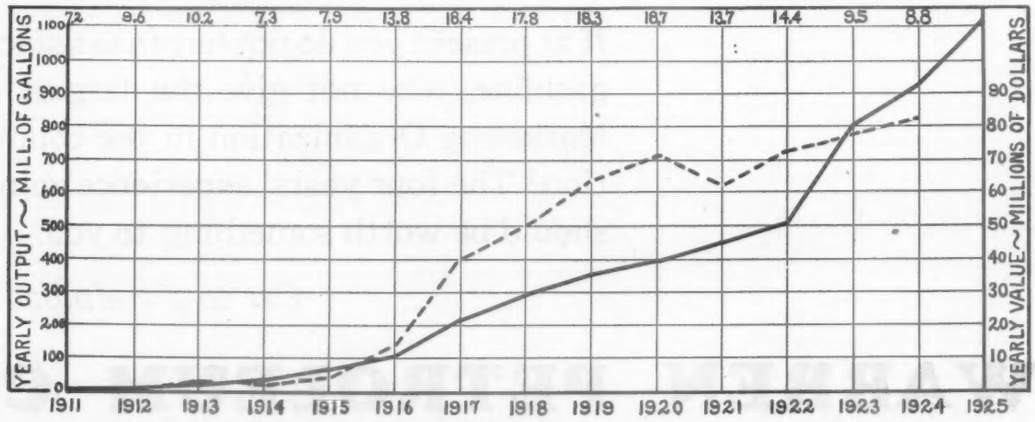

Yearly output and value of natural gasoline in the United States. Solid line, yearly output, in gallons. Dotted line, value of yearly output. Figures along top of graph are average value, per gallon, per year at the plants, based on the total output and total value of raw natural gasoline. Data from reports of United States Geological Survey and the United States Bureau of Mines

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Absorbent Oil For Natural Gasoline

New Product Adds to Quality of Natural Gasoline and Lower Costs. Has Initial of 400° Fahrenheit With Average Boiling Point of 450-460° Fahrenheit

By Arthur L. Davis*
Chief Chemist, Empire Refineries, Inc., Okmulgee, Okla.

Years of experience, with constantly improved methods of manufacture with an improvement in the quality of products, have convinced the natural gasoline manufacturer that certain physical and chemical characteristics of the absorbent oil should be observed in order that the most satisfactory recoveries from natural gas might be obtained for the quality of the finished natural gasoline required.

Certain characteristics, which are given, may be of questionable value in the opinion of certain experienced natural gasoline manufacturers, but are presented in order that all the properties of possible value might be given.

Color—Good, to guarantee no lowering of color of the finished natural gasoline due to contamination by small quantities of lower boiling fractions.

Distillation—Initial boiling point well above maximum boiling point of natural gasoline.

Doctor—Sweet, to guarantee no contamination of finished natural gasoline by the presence of small quantities of sour absorbent oil.

Emulsion—Good, in order that emulsion troubles in absorption system can not possibly originate with the oil.

Pour point—Low, so that satisfactory circulation and distribution of absorbing medium may be had under all operating temperatures encountered.

Saturation—High, since maximum saturation obtainable from gas of any given natural gasoline content, with equal recovery, lowers operation costs.

Unsaturation—Low, since product of high per cent unsaturated compounds do not seem to be the most suitable absorbents.

Vapor pressure — Low, in order that losses due to saturation of all natural gas treated with absorbent oil may be reduced to the minimum.

Viscosity — Low, in order that maximum distribution may be secured.

The work presented deals primarily with the saturation obtainable by the use of refined fractions of specially prepared oils for this purpose, but still those which may be easily available for plant use.

Oil-Pure Hydrocarbons

The most satisfactory means of beginning such a study is to consider the action of certain pure hydrocarbons when absorbed in other pure hydrocarbons. In this manner we may obtain a preliminary view of what might be expected when we have a homologous series of these hydrocarbons, both in the natural gasoline and the absorbent oil, which will be finally considered. Other hydrocarbons, which are invariably present in varying proportion, have not been considered, since their inclusion would complicate calculations in a proportion not warranted by the amounts present.

According to Raoult's law the vapor pressure of a solution is proportional to the mol fraction of the solvent present in the solution. The vapor pressures calculated are those of methane, ethane, propane, butane, pentane and hexane in the homologous paraffin hydrocarbons, ethane, propane, butane, octane, decane, tridecane and hexadecane, at a temperature of 60 degrees Fahrenheit and a concentration of solute in solvent of 10 per cent by volume. The values for the vapor pressures of methane, ethane, propane and butane were calculated by the use of critical data for these hydrocarbons in connection with Duhring's rule. The physical characteristics of the hydrocarbons used in this paper are shown in Table 1.

*Annual convention, Association of Natural Gasoline Manufacturers, Tulsa, Okla., May 5 and 6.

PROPERTIES OF NEW ABSORBENT OIL

The vapor pressures of pure paraffin hydrocarbons, methane to hexane (as gases) in equilibrium with the pure hydrocarbons, methane to hexadecane (as absorbents) were calculated in obtaining the data on which this paper is based. A natural gas taken to contain pure hydrocarbons, methane to octane, present in quantities directly proportional in per cent by weight to the vapor pressure of the respective hydrocarbons, indicated that butane was the most desirable absorbent.

Experimental data indicate that octane (b.p. 259 degrees Fahrenheit) would be the best absorbent. Present economic conditions would limit the change from the average absorbent oil of average boiling point of 550-570 degrees Fahrenheit to one of average boiling point of 250 degrees Fahrenheit to an absorbent oil of average boiling point of 450 degrees Fahrenheit (initial 400 degrees Fahrenheit, maximum 500 degrees Fahrenheit).

The absorbent oil which would be considered best for operation in the recovery of natural gasoline may be prepared with the following characteristics:

Color—16 to 21 Saybolt as required.

Distillation—Initial 400 degrees Fahrenheit, maximum 500 degrees Fahrenheit, average boiling point 450-460 degrees Fahrenheit. The initial here is well above the maximum of natural gasoline which will ordinarily be from 275-350 degrees Fahrenheit.

Doctor—Sweet.

Emulsion—Good.

Pour point—Below zero degree Fahrenheit.

Saturation—Same saturation obtainable with present absorbent oil at 30-40 pounds lower operating pressure.

Unsaturation—Low.

Vapor pressure—Slightly higher than present absorbent oil, but not in proportion such as to increase losses which are largely of mechanical nature.

Viscosity—Low.

With these characteristics we have an absorbent oil which has certain advantages over the ones at present in use and should assist the natural gasoline manufacturers materially in operation, both as to quality of products and reduction of cost.

TABLE 1—Physical Properties of Paraffin Hydrocarbons

	Formula	Boiling Point °F.	Critical Data—Pressure, Lbs. per Sq. Inch	Critical Data—Temp. °F.	Mol. Wt.	Specific Gravity 60°F. (H_2O=1)	Vapor Pressure 60°F. m.m.
Methane	CH_4	—265	735	—114	16	0.441	61700
Ethane	C_2H_6	—135	664	— 95	30	0.446	22000
Propane	C_3H_8	— 49	647	207	44	.536	5375
Butane	C_4H_{10}	— 34	523	308	58	.600	1240
Pentane	C_5H_{12}	97	...	...	72	.626	370
Hexane	C_6H_{14}	156	...	...	86	.663	118
Octane	C_8H_{18}	259	...	...	114	.717	15
Decane	$C_{10}H_{22}$	343	...	...	142	.750	2
Tridecane	$C_{13}H_{28}$	453	...	...	184	.792	*1
Hexadecane	$C_{16}H_{34}$	549	...	...	226	.815	*1

*Less than one.

The vapor pressures of the binary hydrocarbon blends are shown in Table 2, with the data for methane, ethane, propane shown graphically in Figure 1 and the data for butane, pentane and hexane shown graphically in Figure 2.

TABLE 2—Vapor Pressures of Pure Hydrocarbon Mixtures

	Solute					
Solvent—	Methane	Ethane	Propane	Butane	Pentane	Hexane
Methane	61700 mm.	....	....	....	....	....
Ethane	28390	22000	....	....	....	....
Propane	16010	7390	5375	....	....	....
Butane	14282	4085	1724	1240	....	....
Hexane	16676	3987	869	262	147	118
Octane	19210	4592	964	203	62	27
Decane	21552	5250	1099	223	59	17
Tridecane	24500	6115	1290	260	68	19.6
Hexadecane	27200	6940	1467	299	78	22.6

Considering the hydrocarbons, methane to hexane, as solute, with the other hydrocarbons, the individual hydrocarbons considered as the best absorbents for the solute used would be as follows:

Solute—	Solvent—
Methane	Butane
Ethane	Hexane
Propane	Hexane
Butane	Octane
Pentane	Decane
Hexane	Decane

It may be noted, particularly, that decane, tridecane and hexadecane were selected, since their boiling points fall approximately at 350, 450 and 550 degrees Fahrenheit, respectively. The average boiling point of 550 degrees Fahrenheit is probably characteristic of the most absorbent oils in use today.

The results obtained by calculating equilibrium conditions of pure hydrocarbons in other pure hydrocarbons at a definite percentage would indicate that the most optimum absorbents for these individuals were those of lower molecular weight and lower boiling point than were currently being used.

Absorbent Oil and Natural Gas

Since natural gas appears in probably as many different proportions of constituents as there are occurrences, it seems that the general trend is that there is a preponderance of methane with decreasing proportions of other gases with increasing boiling points.

A hypothetical natural gas has been taken where the occurrence of the hydrocarbons from methane to octane is directly proportional in per cent by weight to the vapor pressures of the respective hydrocarbons. This value is used for a gas containing 0.5 gallons of natural gasoline per thousand cubic feet of gas (including one-fourth of the butane and all of the pentane, hexane, heptane and octane in the natural gasoline). In considering a natural gas containing 2.5 gallons and 5.0 gallons of natural gasoline, respectively, the proportions of the components of the natural gas and natural gasoline fractions, respectively, have been maintained the same as in the 0.5 gallon gas with the proportions of natural gas and natural gasoline fractions varying in relation to each other.

The characteristics of the three natural gases are shown in Table 3.

With natural gas containing 0.5, 2.5 and 5.0 gallons of natural gasoline per thousand cubic feet, respectively, we may be able to calculate the equilibrium conditions which exist, using pure hydrocarbons from ethane to hexadecane with vapor pressures given at 60 degrees Fahrenheit with the concentration of 10 per cent solute by volume.

The values obtained using the various absorbents are shown in Table 4 and graphically in Figure 3.

TABLE 4—Vapor Pressures With Three Natural Gases and One Concentration

	Solute — Gallons natural gasoline per 1,000 cu. ft. gas.		
Solvent—	0.5	2.5	5.0
Ethane	26620	25750	24810
Propane	13220	12570	10990
Butane	10993	10115	8315
Pentane	11788	10793	8733
Hexane	12738	11639	9394
Octane	14691	13461	10912
Decane	16552	15040	12402
Tridecane	19000	17450	14350
Hexadecane	21200	19500	16150

It would appear from the results obtained that the following hydrocarbons would be most advantageous absorbents for the concentrations of the natural gasolines present:

Gallons Natural Gasoline per 1,000 cu. ft.	Absorbent
0.5	Butane
2.5	Butane
5.0	Butane

It would seem that butane would be the most advantageous absorbent and this again checks the results obtained using the pure hydrocarbons individually.

Concentrations in Absorbent

All the values obtained have been on the basis of concentration of 10 per cent of solute by volume in solvent. The effect of varying concentrations, which normally occur due to design of equipment and conditions of operations, make it imperative that further information may be had regarding the effect of concentration.

With the natural gas containing 0.5 gallons of natural gasoline to 1,000 cubic feet, the equilibrium conditions with concentration of 2.5, 5.0 and 10.0 per cent, respectively, in absorbent oil were considered. The data is shown in Table 5 with graphic presentation in Figure 4.

TABLE 5—Vapor Pressure With One Natural Gas and Three Concentrations

	Nat.Gas 0.5 Gal.	Nat.Gaso. M.Cu.Ft.	Conc. in Absorb't Oil
Solvent—	2.5%	5.0%	10.0%
Ethane	22325	25000	26620
Propane	7190	9670	13220
Butane	3825	6425	10993
Pentane	3557	6437	11788
Hexane	3642	6920	12738
Octane	4283	8134	14691
Decane	5052	9372	16551
Tridecane	6030	11030	19000
Hexadecane	7080	12700	21200

Under these conditions the following appear to be the better absorbents:

Per Cent Concentration— Absorbent Oil	Absorbent
2.5	Pentane
5.0	Butane
10.0	Butane

Still the superiority, as far as absorbent characteristics are concerned, seems to be in favor of butane, which has a boiling point of only 34 degrees Fahrenheit.

Original Data

With the preliminary considerations of the possibilities with pure hydrocarbons

(Continued on Page 121)

TABLE 3—Properties of Natural Gases

	Gallons natural gasoline per 100 cu. ft. gas.		
	0.5	2.5	5.0
Gravity, specific (air=1)	0.681	0.785	0.905
At 60°F. (H_2O=1)	0.438	0.4718	0.5025
Molecular weight, average	19.75	22.6	28.8
Natural gasoline, content by volume at 60°F., per cent	1.435	7.275	14.35
Natural gasoline gravity °A.P.I.	93.9	93.9	93.9
Vapor pressure, average m.m.	52110	50033	46321
Weight/gallons at 60°F., lbs.	3.65	3.93	4.185
Weight/M. cu. ft., lbs.	52.112	59.66	69.12

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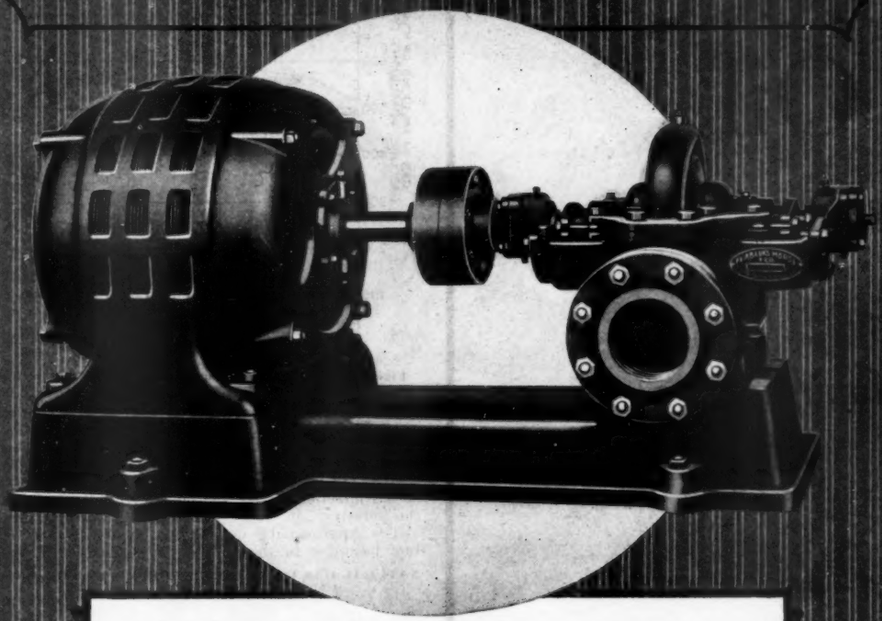

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NATURAL-GAS GASOLINE IN 1924; REVISED REPORT

(Continued from Page 86)

In 1924 producers reported treating approximately 1,016,276,000,000 cubic feet of natural gas in the recovery of natural-gas gasoline, a quantity equivalent to 89 per cent of the total consumption of natural gas in the United States in that year. This contrasts with 87 per cent in 1923, 71 per cent in 1922, and with 54 per cent in 1917. The relationship between the total quantity of natural gas consumed in the United States and the quantity treated for the recovery of natural-gas gasoline for the years 1911-1924 is shown in Figure 6. The statistics show not only the increasing conservation of natural gas but indicate the near approach of the time when the available annual supply of gas, which until 1923 was greatly in excess of the quantity treated for the recovery of gasoline, will be a controlling factor in the growth of the industry.

The approximate quantity of motor fuel produced in the United States can be completed by combining figures showing the production of gasoline at petroleum refineries (including naphthas and other products lighter than kerosene) and figures showing the production of benzol by the coke industry with figures showing the production of raw natural-gas gasoline, making allowance for the raw natural-gas gasoline reported as blended at petroleum refineries and the raw natural-gas gasoline which is run into crude-petroleum pipe lines and mixed with the oil that goes to refineries to be distilled. This has been done for the years 1918-1924, as shown in Figure 7.

The ratio of the production of raw natural-gas gasoline to the total motor fuel produced has increased from 7 per cent in 1918 to 10 per cent in 1924. Data compiled in 1925 indicate that approximately 25 per cent of the motor fuel produced is made by cracking processes. Apparently, therefore, about 64 per cent of the total output of motor fuel comes from "straight-run" processes of manufacture from petroleum, 10 per cent from raw natural-gas gasoline, and about 1 per cent from benzol.

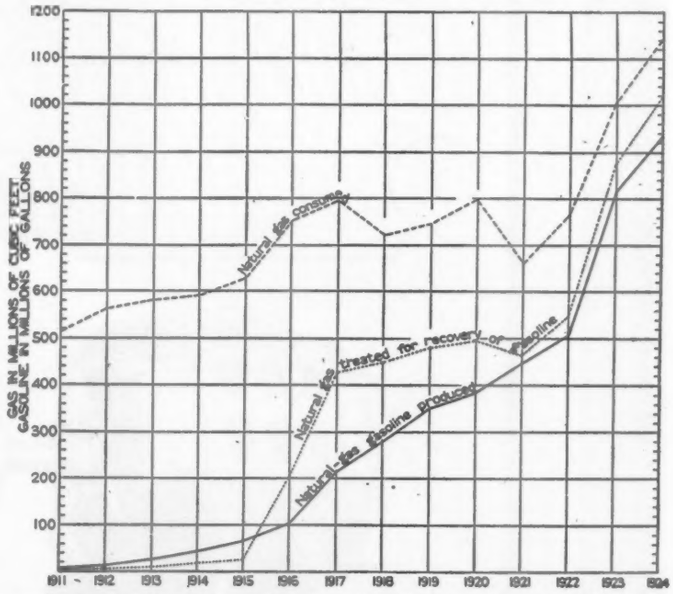


Figure 6.—Natural gas consumed, natural gas treated for recovery of gasoline, and natural-gas gasoline produced in the United States, 1911-1924

NATURAL-GAS GASOLINE PRODUCED IN THE UNITED STATES, 1923-24, BY STATES

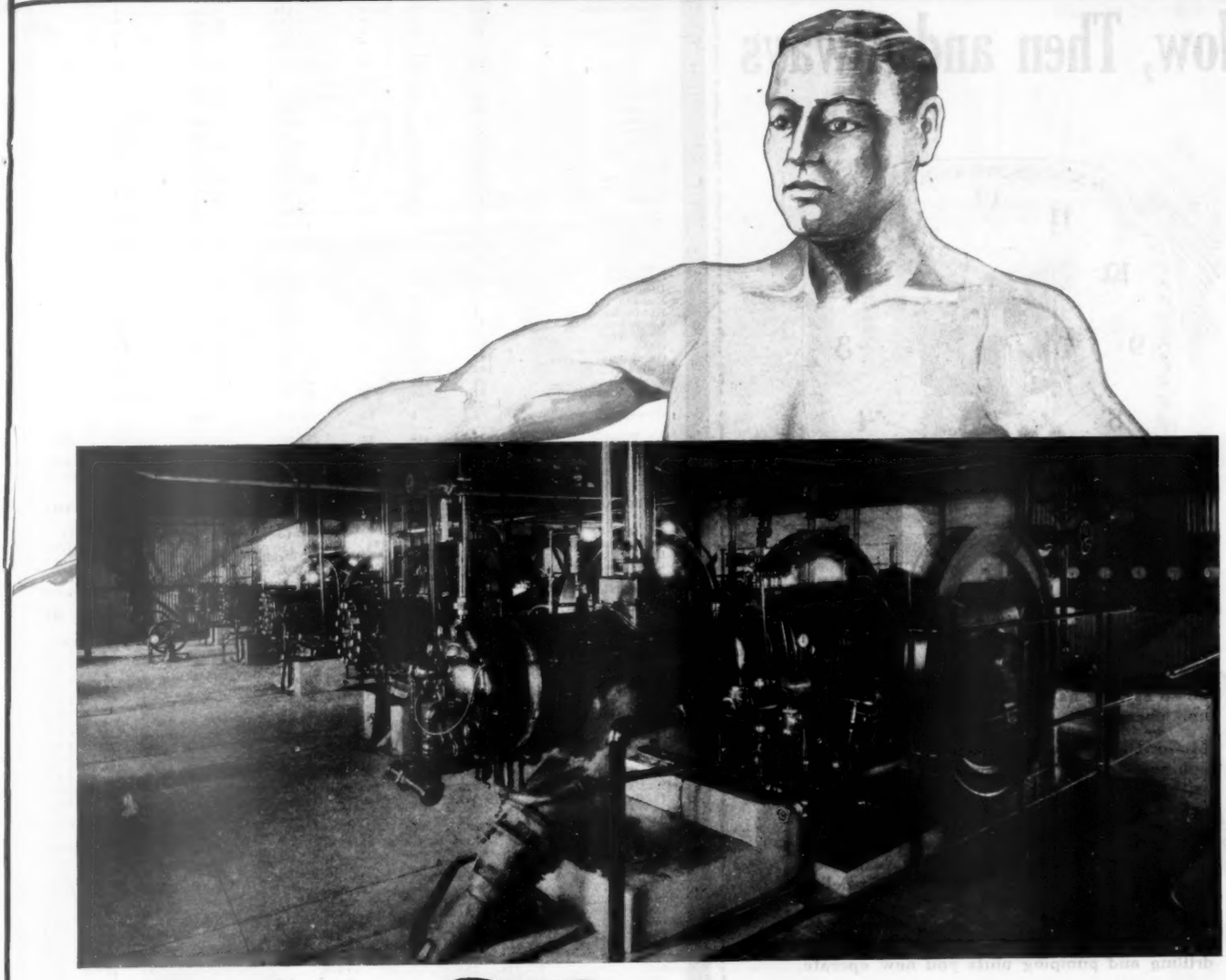
State—	Number of operators reporting*	No. of plants	Raw (unblended) gasoline produced: Thousands of gallons	Value at plant: Thousands of dollars	Av. per gallon (cents)	Estimated quantity of natural gas treated: Millions of cubic feet	Average yield per 1,000 cubic feet (gallons)
1923:							
Arkansas	4	7	16,183	1,916	11.8	3,975	4.1
California	57	119	173,329	16,564	9.6	211,409	.8
Illinois	30	86	7,356	851	11.6	2,207	2.3
Kansas	7	13	8,775	690	7.9	10,843	.8
Kentucky	9	11	7,601	1,067	14.0	22,925	.3
Louisiana	25	35	40,720	3,484	8.6	87,944	.5
New York	5	5	408	44	10.8	640	.6
Ohio	25	44	10,035	1,446	14.4	39,805	.3
Oklahoma	108	279	270,249	23,012	8.5	136,563	2.0
Pennsylvania	127	196	19,132	2,569	13.4	55,238	.3
Texas	43	100	177,765	14,753	8.3	113,733	1.6
West Virginia	58	162	63,381	8,890	14.0	164,906	.4
Wyoming	8	10	21,292	1,992	9.4	24,523	.9
Total	*445	1,067	816,226	77,268	9.5	875,711	.9
1924:							
Arkansas	5	9	17,533	1,784	10.2	3,243	5.4
California	61	140	232,579	22,690	9.8	217,445	1.1
Illinois	29	85	9,091	795	8.7	3,451	2.6
Kansas	8	14	11,653	913	7.8	15,796	.7
Kentucky	8	10	7,274	769	10.6	24,618	.3
Louisiana	33	45	48,098	3,887	8.1	136,448	.4
New York	5	5	477	50	10.5	381	1.3
Ohio	26	47	9,443	1,148	12.2	38,865	.2
Oklahoma	108	281	301,062	23,338	7.8	172,111	1.7
Pennsylvania	127	191	19,254	2,266	11.8	63,104	.3
Texas	44	106	186,571	14,460	7.8	143,554	1.3
West Virginia	56	152	61,549	7,154	11.6	160,007	.4
Wyoming	8	11	29,272	2,979	10.2	32,253	.9
Total	*457	1,096	933,861	82,233	8.8	1,016,276	.9

*A producer operating in more than one state is counted only once.

NATURAL-GAS GASOLINE PRODUCED IN THE UNITED STATES, 1922-1924, BY METHODS OF MANUFACTURE

State—	No. of plants: Comp.	No. of plants: Absorption including comb. absp. process with compression and charcoal processes	No. of plants: Charcoal	Raw (unblended) gasoline produced (thousands of gallons): Comp.	Raw (unblended) gasoline produced (thousands of gallons): Absorption including comb. absp. process with compression and charcoal processes	Raw (unblended) gasoline produced (thousands of gallons): Charcoal	Raw (unblended) gasoline produced (thousands of gallons): Drip
1922:							
Arkansas	...	1	*	.....	4,298	*	....

ing Plants in the Natural "Gas" Field



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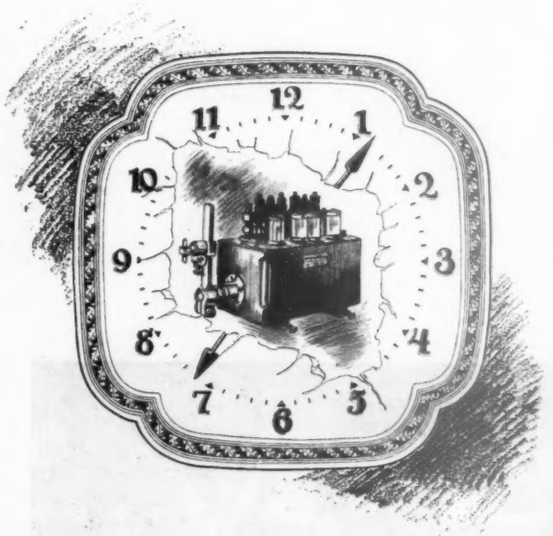

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Illinois	78	...	*	7,752	.....	*	3
Kansas	5	3	*	909	1,928	*	19
Kentucky	5	3	*	561	4,644	*	...
Louisiana	13	13	*	8,998	19,941	*	467
New York	3	1	*	281	225	*	....
Ohio	29	13	*	1,334	7,253	*	13
Oklahoma	197	70	*	137,712	51,022	*	669
Pennsylvania	168	27	*	9,116	9,345	*	57
Texas	34	22	*	62,794	33,426	*	185
West Virginia	85	66	*	12,591	43,996	*	269
Wyoming	4	1	*	19,869	98	*	....
Total	648	269	*	284,475	219,440	*	1,917
1923:							
Arkansas	...	7	..	.....	16,089	....	94
California	20	99	..	14,937	158,392	....	....
Illinois	86	...	..	7,355	.....	....	1
Kansas	5	3	..	4,459	4,301	....	15
Kentucky	3	5	3	462	6,603	536	....
Louisiana	13	21	1	9,317	30,906	497	....
New York	4	1	..	315	93	....	....
Ohio	39	15	..	1,251	8,777	....	7
Oklahoma	178	101	..	138,455	130,991	....	803
Pennsylvania	168	27	1	7,943	10,912	204	73
Texas	42	58	..	80,033	97,703	....	29
West Virginia	68	91	3	5,627	53,378	1,186	230
Wyoming	4	6	..	17,718	3,474	....	100
Total	620	439	8	290,872	521,519	2,423	1,412
1924:							
Arkansas	...	9	..	.....	17,533	....	....
California	16	124	..	13,529	219,059	....	....
Illinois	85	...	..	9,089	.....	....	2
Kansas	5	9	..	614	11,042	....	2
Kentucky	3	4	3	1,128	5,132	964	....
Louisiana	14	30	1	7,105	†40,952	*	41
New York	4	1	..	333	144	....	....
Ohio	30	16	1	1,268	†8,170	*	5
Oklahoma	176	105	..	117,424	183,128	....	510
Pennsylvania	164	23	4	7,315	10,716	1,076	147
Texas	43	63	..	66,995	119,478	....	98
West Virginia	93	56	3	12,968	46,856	1,383	342
Wyoming	{ 31 / 5 }	5	..	20,135	9,059	....	78
Total	639	445	12	257,894	670,678	4,064	1,225

*Charcoal included under combination processes. Separate data not collected. †Charcoal included under combination processes in order to avoid disclosing the production of individual operators. ‡Refrigeration.

NATURAS-GAS GASOLINE TURNED INTO CRUDE-PETROLEUM PIPE LINES IN THE UNITED STATES, 1923-24, BY STATES, IN GALLONS

State—	1923	1924	State—	1923	1924
California	50,398,000	67,135,000	Texas	3,529,000	847,000
Illinois	36,000	.....	West Virginia	25,000	.....
Louisiana	3,049,000	373,000	Wyoming	1,838,000	.....
Oklahoma	15,418,000	1,640,000			
Pennsylvania	252,000	.....	Total	74,535,000	69,495,000

NATURAL-GAS GASOLINE PRODUCED IN THE UNITED STATES, 1911-1924, BY STATES, IN THOUSANDS OF GALLONS

Year—	Ark.	Calif.	Colo.	Illinois	Kansas	Kent'y.	Louisiana	N.Y.	Ohio
1911	.....	*	*	*	.....	*	.....	*	1,679
1912	.....	1,041	*	*	.....	*	.....	*	1,719
1913	.....	3,461	*	*	*	*	.....	*	2,073
1914	.....	7,581	*	1,164	*	*	.....	*	2,440
1915	.....	12,235	*	1,035	*	*	.....	*	2,199
1916	.....	17,159	*	2,260	215	725	2,113	*	2,639
1917	.....	28,818	*	4,934	1,175	3,818	4,980	*	5,440
1918	.....	32,269	2	4,575	2,390	3,331	7,021	218	6,745
1919	.....	40,386	..	6,060	3,284	5,136	10,063	468	8,801
1920	.....	48,208	..	6,055	4,331	4,497	10,610	411	10,016
1921	.....	58,220	..	7,536	3,587	4,242	16,341	366	9,100
1922	4,289	67,120	..	7,760	2,856	5,205	23,406	508	8,600
1923	16,152	173,329	..	7,356	3,775	7,601	40,720	408	10,035
1924	17,583	232,579	..	9,091	11,658	7,274	48,098	477	9,443
Total	38,005	723,006	*	57,826	38,271	41,829	168,352	2,844	80,929
Percentage of ttl.	0.9	17.2	..	1.4	0.9	1.0	4.0	0.1	1.9

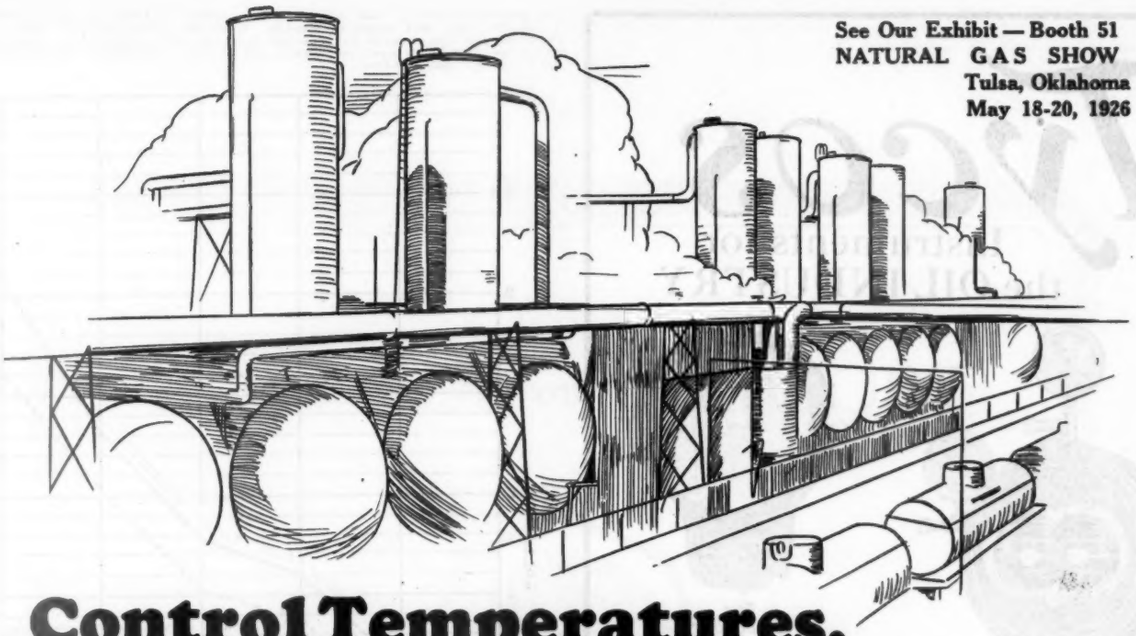
Year	Oklahoma	Penna.	Texas	W.Va.	Wyo.	Miscel.	Total	Value at plant Thousands of Dollars	Av. per gallon cents
1911	388	1,467	.....	3,660	.....	232	7,426	532	7.2
1912	1,575	2,041	.....	5,318	.....	387	12,081	1,157	9.6
1913	6,462	3,680	.....	7,662	.....	732	24,061	2,458	10.2
1914	17,278	4,612	.....	9,278	.....	306	42,653	3,106	7.3
1915	31,666	5,899	*	10,854	.....	877	65,365	5,151	7.9
1916	48,360	9,715	1,293	18,765	.....	249	103,493	14,331	13.8
1917	115,123	13,826	6,920	32,669	.....	181	217,884	40,189	18.4
1918	163,701	15,775	7,326	37,604	1,579	.....	282,536	50,364	17.8
1919	189,995	20,284	9,337	52,150	5,581	.....	351,535	64,197	18.3
1920	178,357	21,151	32,956	58,941	3,711	.....	384,744	71,788	18.7
1921	185,341	19,856	77,141	54,646	14,558	.....	449,934	61,815	13.7
1922	189,404	18,518	95,405	56,796	19,967	.....	505,832	72,711	14.4
1923	270,249	19,132	177,765	63,381	21,292	.....	816,226	77,268	9.5
1924	301,062	19,254	186,571	61,549	29,272	.....	933,861	82,233	8.8
Total	1,699,462	175,210	594,714	473,273	100,960	†2,950	4,197,631	547,300	130.
Perct'g of total	40.5	4.2	14.1	11.3	2.4	0.1	100.0	.....	...

*Included under "miscellaneous." †Includes also Colorado for 1918.

NATURAL GAS PRODUCED AND CONSUMED IN THE UNITED STATES AND PORTION TREATED FOR RECOVERY OF NATURAL-GAS GASOLINE, 1911-1924

	Prod. and delivered to consumers (Millions of Cu. Ft.)	Consumed (Millions of Cu. Ft.)	Treated for recovery of gasoline (Millions of Cu. Ft.)	Ratio (percentage) of natural gas treated for gasoline To quantity prod. and del. to consumers	To quantity consumed
1924:					
Arkansas	36,616	44,595	3,243	9	7
[1]California	189,692	189,692	217,445	115	115
Illinois	4,072	4,072	3,451	85	85
Kansas	25,580	40,258	15,796	62	39
[2]Kentucky	12,875	21,514	24,618	191	114
Louisiana	160,945	163,469	136,448	85	83
New York	[3]6,196	16,506	381	6	2
Ohio	47,396	111,353	38,865	82	35
Oklahoma	214,452	183,451	172,111	80	94
Pennsylvania	105,863	123,932	63,104	60	51
[1,2]Texas	[4]107,247	107,447	148,554	139	138
[5]West Virginia	182,285	79,240	160,007	88	202
Wyoming	46,036	44,879	32,253	70	72
Others	2,266	10,804	.....	..	..
Total	[6]1,141,521	1,141,482	1,016,276	89	89
1911	512,993	2,476		0.5	
1912	562,203	4,688		1	
1913	581,893	9,889		2	
1914	591,867	16,895		3	
1915	628,579	24,064		4	
1916	753,170	208,705		28	
1917	795,110	429,288		54	
1918	721,061	449,109		62	
1919	745,916	480,404		64	
1920	798,210	496,431		62	
1921	862,052	465,097		70	
1922	762,546	545,139		71	
1923	[7]1,006,976	[7]1,006,967	875,711	87	87

[1]Large quantities of gas both before and after the recovery of gasoline were blown in the air or unaccounted for. [2]Quantities of natural gas were piped from other states, treated



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REPUBLIC ELECTRICAL LIQUID LEVEL RECORDERS

These instruments are of particular value to Oil Refineries. They are designed for electrically measuring the amount of oil, water, or other liquids in tanks, reservoirs, standpipes, etc. The cut shows a panel board with an indicating and recording instrument mounted on it. These reading instruments can be located at any desired distance from the points of measurement. They save time and money where it is necessary for men to go about the tank fields gauging the tanks. With liquid level recorders it is possible to have all this information taken at one point.

REPUBLIC RECORDING PYROMETER

Of great value in the oil refinery where a permanent record of heating conditions is desired. Through them you obtain:

1—Accuracy and Ruggedness.
2—Separate chart arrangements and all mechanisms on a swinging bracket and instantly accessible.
3—Six-inch charts. Wider than any other Duplex. Highest internal resistance of any double-pivoted system.

Bulletins on any of above instruments sent without obligation.

DRAFT INDICATORS

Permanent zero setting, 12-inch dial. Is easily read at a glance.

REPUBLIC STEAM DISTRIBUTION METER

This meter is especially adapted for metering steam consumed by the different departments, steam sold to outside concerns, used by turbines, etc. All the reading instruments can be located at a central panel board.

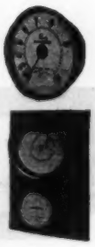
REPUBLIC GAS METER

Of practical value in oil refineries. Will record the amount of by-product gas, producer gas, etc.

REPUBLIC BOILER METER

The Indicator (15" dial) located on the boiler front, tells just what the boilers are doing, and enables the fireman to balance the loads and shows up any faulty condition in the boiler.

The Recorders and Integrators due to electrical operation may be located at any distant point such as the Engineer's office. The average refinery installation will pay for its cost in less than six months. Write for an engineering survey giving in detail savings that have been effected in other installations; also the methods used.



REPUBLIC WATER METERS

Have many and varied duties to perform in the oil refinery. They are exceptionally accurate and valuable for measuring the flow of feed water, brine, chemicals, etc. Like other Republic Instruments, the reading instruments can be placed at any desired distance from the points of measurement. The illustration shows a panel board with an indicating, integrating and recording instrument mounted on it. These meters have an exceptionally wide range of uses and are real efficiency instruments for men interested in exact measurement.

REPUBLIC COAL METERS

An instrument for automatically registering the amount of coal consumed on Chain Grate Stokers.

REPUBLIC FLOW METERS

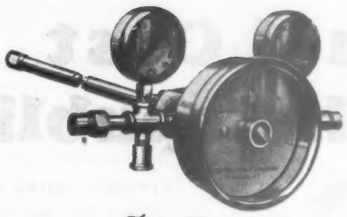
Republic Flow Meters Company
2247 Diversey Parkway Chicago, Illinois
Branch offices in 25 Principal Cities

Tycos

Instruments for the OIL INDUSTRY

Tycos Temperature Control Dubl-Duty

Tycos Recorder

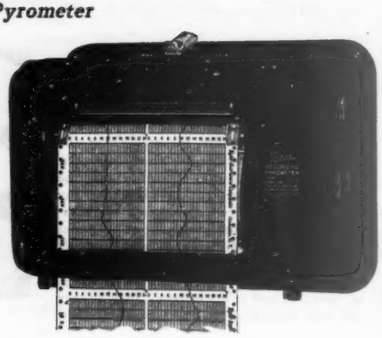


Tycos Type "P" Temperature Regulator

Tycos Pyrometer

Tycos Thermometer

Tycos Recording Pyrometer



If you would like to know how these instruments can help you, write for Oil Refinery Catalog.

Taylor Instrument Companies
Rochester, N. Y., U. S. A.
Canadian Plant, *Tycos* Bldg., Toronto
Manufacturing Distributors in Great Britain:
Short & Mason, Ltd., London

Tycos

Temperature Instruments

Indicating Recording Controlling

for gasoline recovery, and residue gas returned to state in which produced. [3]Includes 12,000,000 cubic feet piped to Canada. [4]Includes 27,000,000 cubic feet piped to Mexico. [5]Natural gas was treated for gasoline recovery and consumed in other states. [6]Includes 39,000,000 cubic feet piped to Canada and Mexico. [7]Includes 9,000,000 cubic feet piped to Mexico. [8]Revised figures.

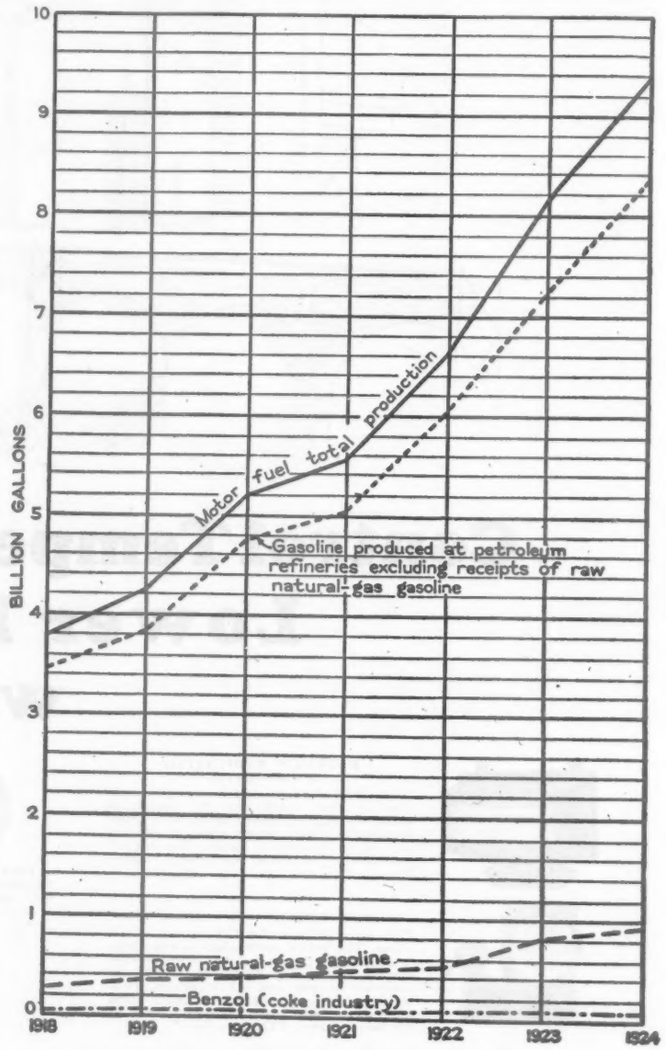


Figure 7.—Motor fuel produced in the United States, 1918-1924

APPROXIMATE PRODUCTION OF MOTOR FUEL IN THE UNITED STATES, 1918-1924, IN THOUSANDS OF GALLONS

	1918	1919	1920	1921	1922	1923	1924
Gasoline, including naphthas and other products lighter than kerosene, produced at refineries.	3,570,313	3,957,857	4,882,547	5,153,549	6,202,235	7,555,945	8,959,680
Raw natural-gas gasoline blended at refineries	102,956	124,185	132,423	105,696	153,795	230,454	532,195
Raw natural-gas gasoline turned into crude petroleum pipe lines (to be recovered by distillation)	*	*	*	*	6	74,535	89,495
Raw natural-gas gasoline produced	282,536	351,535	384,744	449,934	505,832	816,226	933,861
Benzol produced by the coke industry	44,805	61,068	83,371	54,459	70,111	97,335	91,904
Motor fuel produced.	3,794,698	4,246,275	5,218,239	5,552,246	6,624,383	7,164,517	9,363,755
Percentage of raw natural-gas gasoline produced to total motor fuel produced	7.4	8.3	7.4	8.1	7.6	10.0	10.0

*Data not available.

NEW OIL AREAS IN ILLINOIS

A new bulletin series entitled, "Illinois Petroleum," is to be issued by the Illinois State Geological Survey to make the results of investigations bearing on the exploration and recovery of oil and gas in Illinois available for the benefit of the petroleum industry of the State at the earliest possible moment. According to an article entitled, "Petroleum Developments During 1925," by Gail F. Moulton, in the first issue, Illinois prospecting in 1925 proved up about 900 acres of new territory in Wabash County, about 100 acres of new territory in Clark County, 80 acres in Marion County and some minor additions in other portions of the State.

SCIENCE AIDS FOREIGN OUTPUT

The Russian and Persian oil fields promise increased production from now on due to more scientific methods and more methodical development, says the Union Oil Bulletin. Rumania also is expected to reduce slightly the calls for American oil overseas, but a falling off in volume in Burma and other fields indicates the necessity for further development in the foreign fields and the opening up of new territory.

A SYMBOL *and its* IMPORT

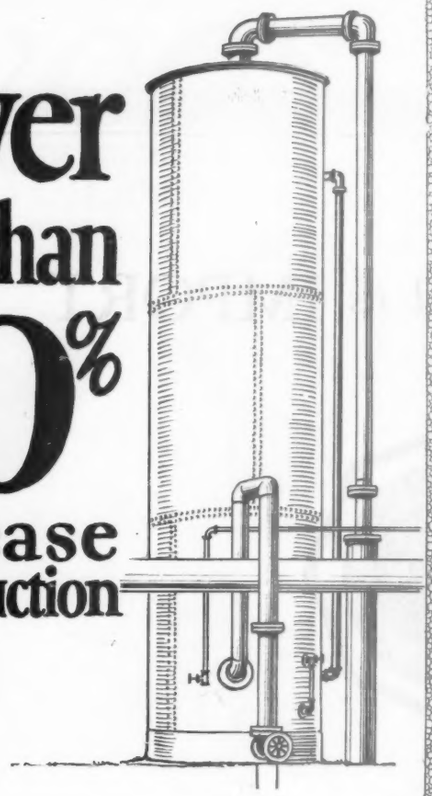
. . This Mark is a symbol of correct engineering theory based upon specialized engineering knowledge; of proper materials fabricated in a highly developed factory; and of efficient performance under specified conditions.

C. F. BRAUN & CO.
Manufacturing Mechanical Engineers
Tulsa Alhambra, Calif. Dallas

BRAUN

FLUID HEATERS . . . . . COOLERS . . . . . HEAT EXCHANGERS
GASOLINE PLANTS . . . REFINERY APPARATUS . . . POWER PLANT EQUIPMENT

Never less than 20% increase in production



In every gasoline plant where Campbell Oil-Froth Absorbers have been installed production has been greatly increased and there has not been a single instance where they have failed to give less than 20% increase. At the present time more than one-third of all gasoline produced from natural gas in Southern California is obtained through these absorbers and the percentage is growing every month.

We have prepared an interesting booklet giving data that every Refining Engineer should have. May we send a copy to you?

J. A. Campbell

Consulting—Designing—Constructing
Natural Gas Engineer

P. O. Box 669 LONG BEACH, CALIF.

CAMPBELL
OIL FROTH
absorber

ANDERSON IS ONE OF THE FEW REMAINING POOR MAN'S FIELDS

The Anderson Countian, a long-established weekly newspaper published at Garnett, Kans., has just issued a special oil edition devoted to the Anderson County oil field. H. G. Hotchkiss, oil and gas producer, with a flare for writing, compiled or edited most of the data that entered into a very interesting and complete presentation of facts concerning a shallow-sand area of which little has been said, and John L. Rich, well-known geologist, of Ottawa, Kans., contributes a story on the geological features of the territory.

In Mr. Rich's article it is brought out that the Colony gas field was discovered in the spring of 1921 and the shoestring pool developed south of Garnett was opened the same year. The results of five years of development is a gas field 13 miles in length and an oil field 14 miles long and another 5 miles long, all three narrow shoestring sands. Small developments have been opened in scattered parts of the county.

In discussing sands Mr. Rich says oil or gas production is found at three horizons. The first lying from 475 feet to 675 feet, and in the Bandera shale is about the horizon at which the Peru sand is found in northern Oklahoma. It is irregularly distributed in relatively narrow stringers apparently of the sand bar type. Its thickness, he says, ranges from 50 to 60 feet. Over most of the county this sand carries water but northwest of Welda; west and also probably east of Garnett and along Deer Creek, 2 miles east of Colony, it has carried gas in commercial quantities. Part of the oil production of the pool east of Greeley is also reported to come from this sand.

Ranging from 600 feet in the east to 825 feet in the west end of the county, Mr. Rich says, lies the second, or Garnett, sand a little below the Cherokee shales. Two principal shoestring channels are now known, the Garnett string and the Bush City string, the former developed 4½ miles and the latter for nearly 14 miles. Both are likely to be extended for a considerable distance farther.

Gas in the Bartlesville

The Bartlesville Zone lies at depths varying from 875 to 1,000 feet, says Mr. Rich. This is the horizon of the Colony gas sand and of several smaller gas "pools" west of Garnett, north of Bush City and south of Greeley. This sand body is about half a mile wide and 100 feet thick in the center. Wells of 20,000,000 to 30,000,000 feet in initial production have been completed and some oil has been found in this sand.

Below the Colony sand is another which has shown oil and gas, but little commercial production. The Mississippi lime has not yielded any commercial production in Anderson County although low gravity oil in small quantity has been found in the top of the lime south of Kincaid and east of Kincaid in Linn County.

Production Increasing

The production of Anderson County is higher at this time than ever in its history. In 1925 the county is credited with an output of 824,039 bbls., or an average of 2,258 bbls. a day. Today it is close to 3,250 bbls. a day from 796 oil wells, averaging 4 bbls. per well. There are 368 gas wells. A total of 576 widely scattered dry holes have been drilled in the county, which shows how earnestly the wildcatter has combed the territory in search of new pools.

Operating Cost Low

The Anderson Countian says the average cost of a dry hole in the county is less than $1,500. In the Bush City district many dry holes were drilled for less than $1,000. About $864,000 has been spent in the county on failures. Over against this must be put the net proceeds from the gas and oil wells in the county which have been sufficient to put the field, as a whole, on a sound basis of profit.

The largest well reported in the county was completed last year by Richards and Polkington in Section 8-21-21, on the Bush City shoestring which started at 500 bbls. from sand at 593-620 feet and put 2,900 bbls. of 36 gravity oil in the tanks in 10 days.

Section 8-21-21 is probably the richest spot in the county. The Hydorn, Webber, Gadelman and Badder farms have many wells which started at from 200 to 300 bbls. Connelly & Loriaux own most of the production in the section.

Garnett Field Nine Years Old

Discovery of oil in the Garnett Field is credited to Tarbell and the Helena Oil Co. in 1917. The discovery well was located on the Poss farm, north half of the northwest quarter of Section 11-20-20, total depth 693 feet. In September, 1921, the first high gravity well (36 degrees) was completed by J. E. Williard and B. C. Cooper and a Denver syndicate in their No. 1 Bowman, Section 32-20-20, which got 33 feet of pay topped at 655 feet, and a 100-bbl. initial producer. Thereafter oil of 36 gravity was commonly found in this area. In 1925 the Tidal Oil Co. paid $300,000, or at the rate of $1,300 per barrel for a block of producing leases in one of the extensions of the shoestring and is installing a compressed-air plant to increase the production in the old wells. This shoestring pay is a rich brown sugar sand with an average thickness of 38 feet. Over 40 wells completed in this string have started at 200 bbls., or more, and appear to be long-lived.

A Rich Gas Area

The Colony-Welda gas field was opened in May, 1921, by the Teton Co. on the Ruth farm and had an open flow total of 1,350,000,000 cubic feet of gas. The largest well in the field was the Roberts well in Colony which started at 32,000,000 feet. One well on the Colony townsite produced $47,000 worth of gas at 6½ cents per 1,000 feet. The principal producers are the Teton Co., Graham & Long and Grant Colbt. The Empire Gas & Fuel Co. and the J. B. Kirk Co., of Iola, Kans., have been the principal buyers of gas.

Oil was discovered in the Colony area 2 miles northeast of Colony by Graham & Long on the McMillen farm but the first commercial production is credited to Winters & Gentle on the Allbright farm, which occupies the S half SW and the SW SE, Section 28-22-19, about 3 miles northeast of Colony. The oil comes from sand around 800 feet or 200 feet above the gas sand.

Some Lucky Ones

The Anderson Countian devotes a portion of its issue to some outstanding profits made from small investments, which are interesting. Here are a few specimens:

"Shortly after the first Hydorn well was drilled, Richards & Polkington sold this lease and several others for a consideration reported at $35,000.

"Southwestern Petroleum Co. acquired the Webber lease of 80 acres before the Hydorn well was drilled for $500. It yielded big production.

"Whiteside & Fielder bought the Badders lease, northeast quarter of Section 8, from T. G. Adams for $1,600; drilled a few wells on it, and sold out for $60,000 to Connelly & Loriaux.

"T. G. Adams bought the Croan lease in southeast quarter, Section 5, for $160 and within eight months sold it to a Chicago syndicate and Connelly & Loriaux. The consideration never has been reported, but it probably was close to $40,000.

"Another high spot was the big returns earned by a few persons investing $35.71 each in a lease. Seven individuals bought a lease known as the Bandy, south half of the southeach quarter, 32-20-21, for $250. It was a small flier taken as a gamble, and the syndicate became known as the Hardly Able Oil Co. Production came their way and they refused $30,000 cash for the lease, and finally made a drilling deal with Keys, in which they retained a one-half overriding royalty. Some good wells on this lease brought fat returns to the in-

(Continued on Page 130)

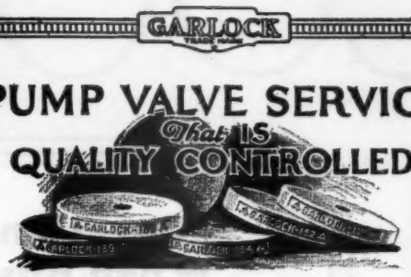
OPERATING PLANTS BY STATES

(Continued from Page 29)

Company, plant location—	Daily Cap. (Bbls.)	Type of Plant	Type of Cracking Process
Marine Refining Corp., Vernon	10,000	S	
O'Donnell Refining Co., Whittier	3,000	S	
Olympic Refining Co., Signal Hill	5,000	S	
Pacific Gasoline Co., Taft	2,000	Top	
Pan American Petroleum Co., Watson	50,000	S&C	Black
Pauley Oil Co., Los Angeles	5,000	S	
Pioneer Paper Co., Vernon	500	A	
Richfield Oil Co., Rioco	27,000	S&A	Cross
Richfield Oil Co., Bakersfield	5,000	S&A	
Richfield Oil Co., Huntington Beach	4,000	S	
Rio Grande Oil Co., Vinvale	3,000	S	
Seaboard Petroleum Corp., Los Angeles	2,500	S	
Seaside Oil Co., Summerland	2,000	S&A	
Seaside Oil Co., Ventura	3,000	S	
Shell Co. of California, Martinez	33,000	Comp	Dubbs
Shell Co. of California, Wilmington	35,200	Comp	Dubbs
Shell Co. of California, Coalinga	4,000	Top	
Standard Oil Co. of Calif., Bakersfield	25,000	S&A	
Standard Oil Co. of Calif., El Segundo	100,000	Comp	
Standard Oil Co. of Calif., Richmond	100,000	Comp	Dubbs
Union Oil Co. of Calif., Wilmington	35,000	SA&C	Cross
Union Oil Co. of Calif., Oleum	27,500	Comp	
Union Oil Co. of Calif., Santa Paula	900	S	
Union Oil Co. of Calif., Bakersfield	3,000	S	
Ventura Refining Co., Fillmore	5,000	Comp	
Vernon Oil Refining Co., Vernon	2,500	S	
Western Oil & Refining Co., Wilmington	5,000	S	
Wilshire Oil Co., Fellows	2,500	S	
Wilshire Oil Co., Vernon	7,500	S	
Total	728,800		
COLORADO			
Raven Oil & Ref. Co., Rangely	200	S	
United Oil Co., Florence	1,500	SC&L	Burton
Total	1,700		
GEORGIA			
Atlantic Refining Co., Brunswick	4,500	Comp	Lewis
ILLINOIS			
Barber Asphalt Co., Madison	250	Asph	
Indian Refining Co., Lawrenceville	20,000	Comp	Cross, Dubbs, Fleming
Lemont Refining Co., Lemont	1,500	S&C	Lemont
Lincoln Oil Refining Co., Robinson	1,200	S&L	
Lubrite Refining Co., East St. Louis	3,000	S&C	Fleming
Red River Refining Co., Burnham	500	Lub	
Roxana Petroleum Corp., Wood River	35,000	Comp	Dubbs-Cross
Standard Oil Co. of Indiana, Wood River	20,000	Comp	Burton
The Texas Company, Lockport	6,000	Comp	Holmes-Manley
White Star Refining Co., Wood River	2,500	S&C	Dubbs
Total	89,950		
INDIANA			
Bartles-Maguire Oil Co., East Chicago	3,000	SCL&A	Jenkins
Sinclair Refining Co., East Chicago	20,000	SL&C	Isom
Standard Oil Co. (Ind.), Whiting	52,000	Comp	Burton-Holmes-Manley
Total	75,000		
KANSAS			
Arkansas City Refining Co., Arkansas City	8,000	S&C	Dubbs
Barnsdall Refineries, Inc., Wichita	5,000	S&C	Dubbs
Derby Oil Co., Wichita	5,000	S&C	Dubbs
El Dorado Refining Co., El Dorado	3,500	S	
Golden Rule Refining Co., Wichita	1,000	S	
Kanotex Refining Co., Arkansas City	9,000	S&C	Jenkins
Manhattan Refining Co. (Kansas City Ref. Co.)	6,000	S&C	Manhattan
Miller Petroleum Co., Humboldt	3,000	S&C	Cross
National Refining Co., Coffeyville	6,000	S&C	National
Peerless Oil & Ref. Co., Chanute	3,000	S&C	Jenkins
Roxana Petroleum Corp., Arkansas City	19,500	S&C	Dubbs
Sinclair Refining Co., Coffeyville	6,000	C&L	Isom
Sinclair Refining Co., Argentine	6,500	S&C	Isom
Skelly Oil Co., El Dorado	14,000	S&C	Jenkins-Cross
Standard Oil Co. of Kansas, Neodesha	12,000	S&C	Burton
Vickers Petroleum Co., Potwin	3,500	S&C	Dubbs
West Kansas Refining Co., Russell	2,500	S	
White Eagle Oil & Ref. Co., Augusta	5,000	S&C	Burton
Total	116,500		
KENTUCKY			
Ashland Refining Co., Ashland	3,000	S	Dubbs
Great Southern Refining Co., Pryse	4,000	S&C	Dubbs
Inter-Cities Oil Co., Scottsville	500	S	
The Louisa Co. of Kentucky, Louisville	3,400	S&C	Fleming
Louisville Petroleum Refining Co., Louisville	1,800	S&C	Dubbs
The Petroleum Refining Co., Latonia	3,000	S&C	Cross
Standard Oil Co. (Kentucky), Louisville	5,000	S&C	Burton
Stoll Oil Refining Co., Louisville	1,500	L	
Total	22,200		
LOUISIANA			
Crystal Oil Refining Corp., Shreveport	3,500	S	
Crystal Oil Refining Corp., Shreveport	5,000	S	
Chalmette Petroleum Corp., Chalmette	4,500	S	
Dartois Oil Refining Co., Shreveport, La.	100	L&A	
Great Southern Refining Co., Ardis	2,000	S	
Liberty Oil Co., New Orleans	4,000	S	
Louisiana Oil Refining Corp., Bossier City and Gas Center (three plants)	16,000	SL&C	Tube & Tank
Mexican Petroleum Corp. of La., Destrahan	25,000	S&A	
New Orleans Refining Co., Norco	10,000	SA&C	Dubbs
Shreveport Producing & Ref. Co., Shreveport	5,500	S&C	Jenkins-Dubbs
Sinclair Refining Co., Mereaux	25,000	S&A	
Standard Oil Co. (La.), Baton Rouge	70,000	Comp	Burton-Tube & Tank
The Texas Company, Ardis	6,000	Top	
Total	176,600		
MARYLAND			
Interocean Oil Co., Baltimore	7,000	SL&A	Leamon-Dubbs
Prudential Oil Corp., Fairfield	10,000	Comp	Dubbs
Standard Oil Co. (New Jersey), Baltimore	32,000	Comp	Burton-Tube & Tank
Total	49,000		
MASSACHUSETTS			
Beacon Oil Co., Everett	15,000	S&A	Tube & Tank
Cities Service Refining Co., E. Braintree	8,500	SC&L	Holmes-Manley
New England Oil Refining Co., Fall River	30,000	S&A	Special
Total	53,500		
MISSOURI			
Standard Oil Co. (Ind.), Sugar Creek	12,000	Comp	Burton
Wilhoit Refining Co., Joplin	2,000	S&C	Jenkins
Total	14,000		
MONTANA			
Absher Refineries, Inc., Kevin	300	S	
Arro Oil & Refining Co., W. Lewistown	2,500	S&C	Dubbs
Big West Oil Co., Kevin	1,500	S	
Hart Refineries, Hedges	100	S	
Hart Refineries, Missouls	300	S	
International Refining Co., Sunburst	4,000	S	
Lewistown Oil & Ref. Co., Lewistown	1,800	S	
Round Up Oil & Ref. Co., Butte	200	S	
Silver Bow Refining Co., Butte	500	S	
Snow Cap Oil Co., Sunburst	300	S	
Sunburst Refining Co., Great Falls	3,000	S	
Yale Oil Corp., Miles City	500	S	
Total	15,200		
NEW JERSEY			
Barber Asphalt Co., Maurer	5,000	S&A	
Standard Oil Co. (N. J.), Bayonne	85,000	Comp	Tube & Tank
Standard Oil Co. (N. J.), Linden	75,000	Comp	Burton-Tube & Tank
Standard Oil Co. (N. J.), Jersey City	17,000	L	
Tide Water Oil Co., Bayonne	40,000	SL&C	Burton

GARLOCK

PUMP VALVE SERVICE That IS QUALITY CONTROLLED



Laboratories

Our Chemical, Physical and Experimental Laboratories are continually doing research work to ascertain if improvements can be made in the rubber compounds as used in the Manufacture of Garlock Pump Valves. This enables us to place on the market the last word in economical and satisfactory Pump Valve Service.

The Garlock Laboratories also stand as a barrier against defective raw materials entering production and as a guardian to guarantee a perfected and inspected finished commodity.

Raw Materials

Only the best of retested and approved raw materials enter our compounding rooms. These crude materials are carefully blended according to a given formula established by our laboratories.

Production

The longevity of a pump valve depends primarily on the compounding of the proper ingredients but in order to produce a Quality Controlled Product having extreme durability it is necessary to control the mixing of the compound on the rubber mill and the rendering of the proper cure in the vulcanizing presses. In the manufacturing of Garlock pump valves all these operations are carried out by trained craftsmen.

Equipment

We have a complete line of molds for practically every size of valve. Stocks of unvulcanized compounds are carried on hand so as to have the facility to ship emergency orders the same day they are received.

GARLOCK Pump Valves are manufactured Complete from the Crude to your Satisfaction in our own factories.

THE GARLOCK PACKING COMPANY

Manufacturers of

Garlock Mechanical Packings

PALMYRA, NEW YORK

The Standard Packing of the World

COOPER GAS

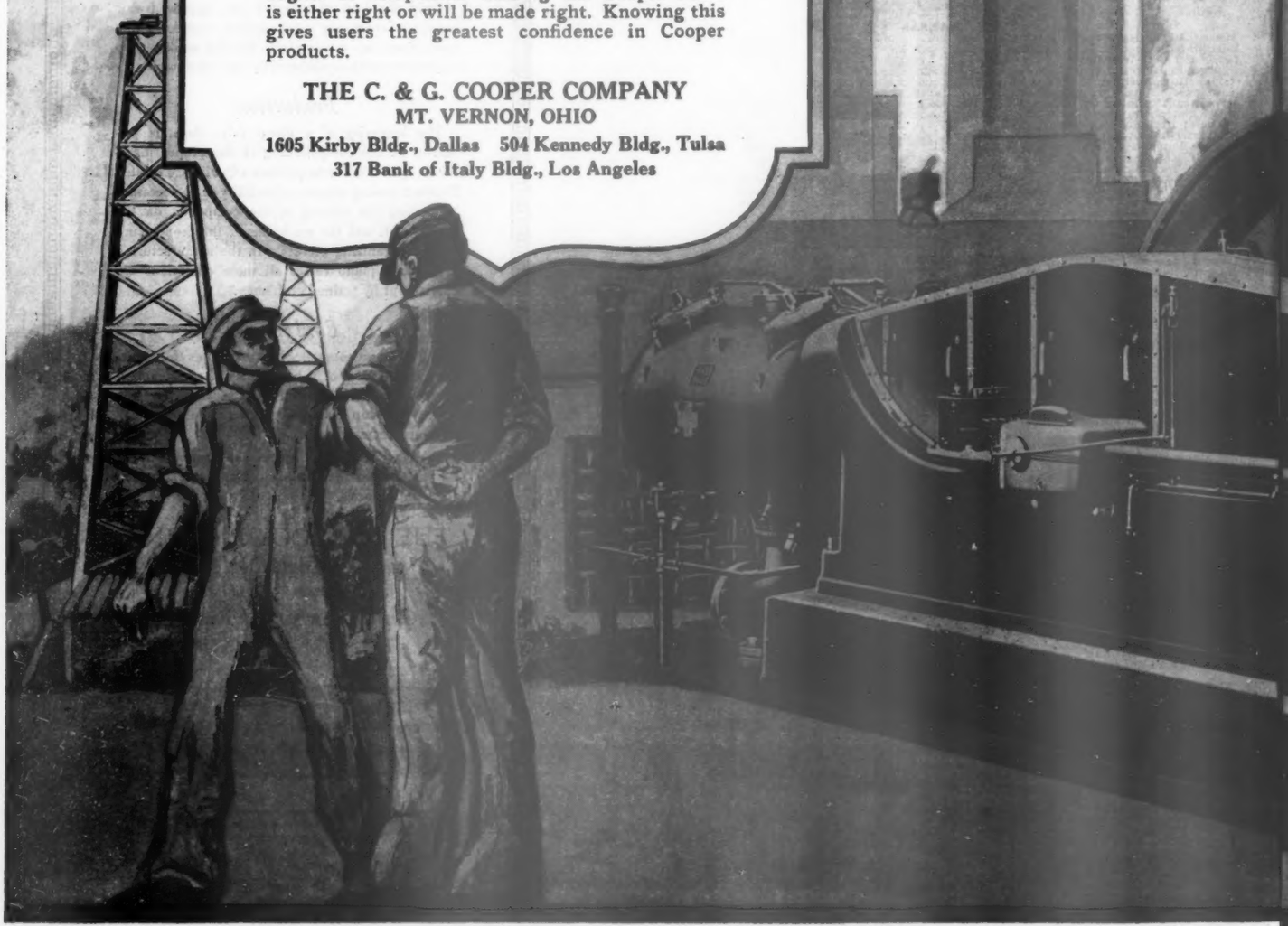
Questions Men Ask When Buying Cooper Engines

How soon can you ship them?
Does The C. & G. Cooper Company recommend this equipment for our service?
Do you guarantee these gas capacities?

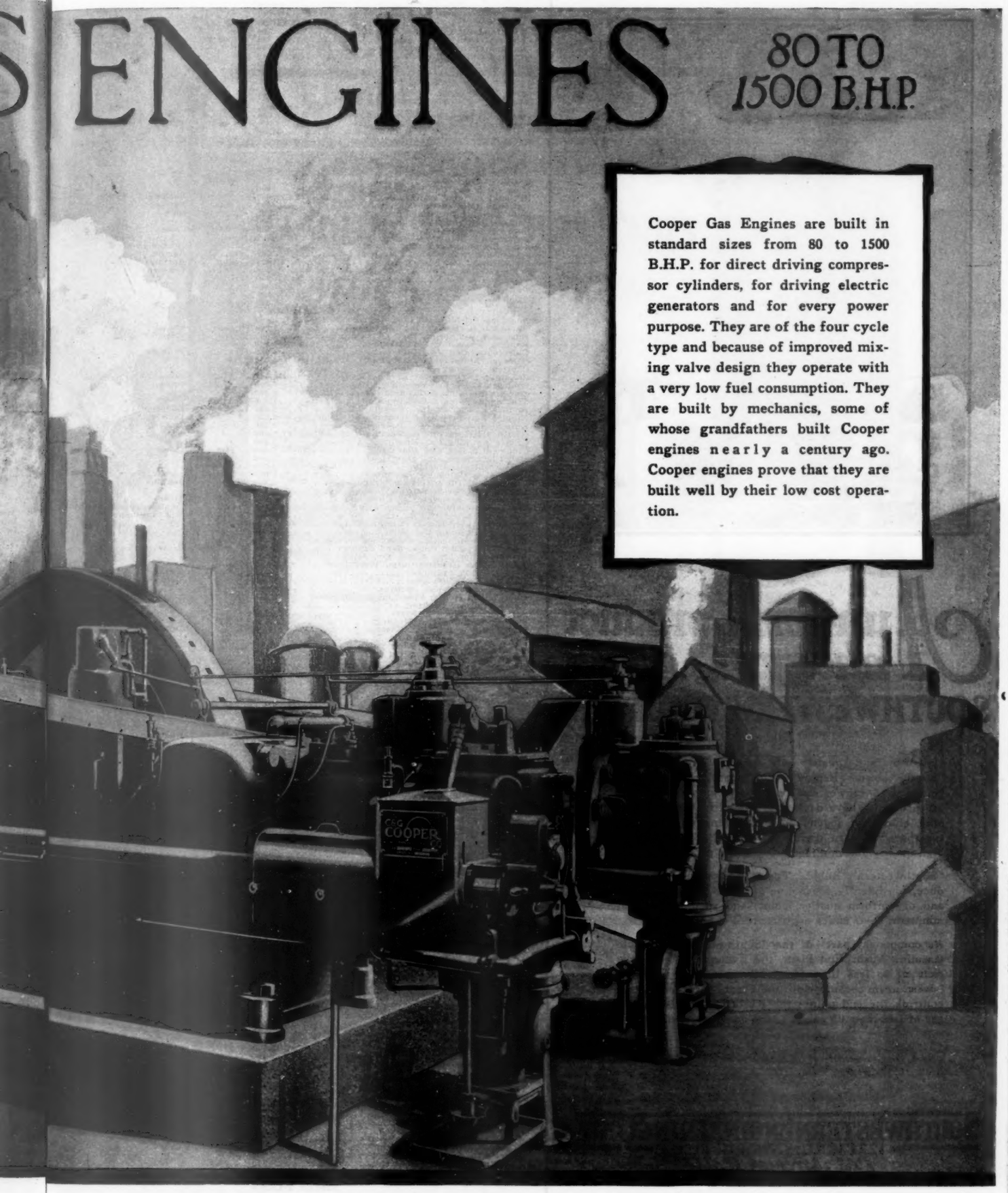
For ninety-three years the Cooper policy has been to make promises which can be met. Today a recommendation by a Cooper engineer is accepted without question by everyone who has ever used Cooper products. Engineering details are seldom mentioned except by the newer customer. A gas engine or compressor bearing the Cooper name is either right or will be made right. Knowing this gives users the greatest confidence in Cooper products.

THE C. & G. COOPER COMPANY
MT. VERNON, OHIO

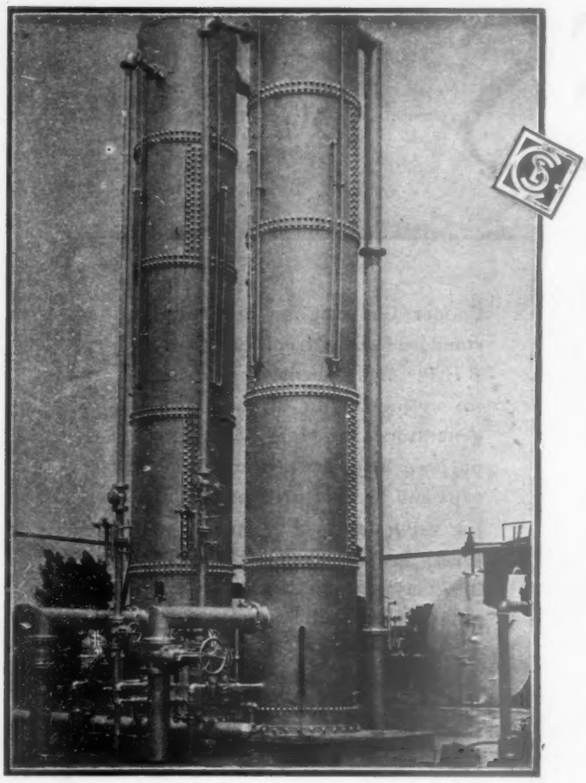
1605 Kirby Bldg., Dallas 504 Kennedy Bldg., Tulsa
317 Bank of Italy Bldg., Los Angeles



ENGINES 80 TO 1500 B.H.P.



Cooper Gas Engines are built in standard sizes from 80 to 1500 B.H.P. for direct driving compressor cylinders, for driving electric generators and for every power purpose. They are of the four cycle type and because of improved mixing valve design they operate with a very low fuel consumption. They are built by mechanics, some of whose grandfathers built Cooper engines nearly a century ago. Cooper engines prove that they are built well by their low cost operation.



A uniform product always . . . when "SOUTHWESTERN" EQUIPPED

Uniform high quality of refinery products, and "Southwestern" Refinery Equipment, are inter-dependent. "Southwestern" engineers, in solving refinery problems, have developed apparatus of real economy, efficiency, dependability and longevity—apparatus that will earn dividends, through the uniformly high quality and minimum cost of the product.

"Southwestern" Bubble Tower equipment will produce, consistently, a gasoline of any end point desired, and of uniform quality, color, and specifications, at minimum cost, under a guaranteed performance.

As component parts of the "Southwestern" Portable Gasoline Absorption Plant, the Evaporator strips the rich oil to less than ½ of 1% saturation, with the lowest steam consumption; the Fractionator accurately controls the end point; the Absorber delivers a tail gas of less than .05 gal. per 1000 cu. ft. (charcoal test).

There is a "Southwestern" installation near you; let us send data of its work, also catalog R, covering full details.

SOUTHWESTERN ENGINEERING CORP.
1221 HOLLINGSWORTH BLDG.
Los Angeles, Calif.

Company, plant location—	Daily Cap. (Bbls.)	Type of Plant	Type of Cracking Process
Vacuum Oil Co., Paulsboro	13,000	Comp	Ellis-Fleming-Cross
Warner-Quinlan Co., Warners	5,000	SL&C	Dubbs
Total	241,000		
NEW MEXICO			
Bloomfield Oil & Gas Co., Bloomfield	300	S	
Continental Oil Co., Artesia	1,000	S	
Continental Oil Co., Farmington	500	S	
Gilliland Oil Co., Roswell	500	S	
Gilliland Oil Co., Albuquerque	500	S	
Sullivan Refineries, Inc., Dayton	1,000	S	
Sullivan Refineries, Inc., Clovis	500	S	
Total	4,800		
NEW YORK			
Sinclair Refining Co., Wellsville	4,000	S&L	
Standard Oil Co. (N. Y.), Brooklyn	24,000	Comp	Burton-Cross
Standard Oil Co. (N. Y.), Buffalo	3,500	Wax	
Vacuum Oil Co., Olean	7,000	Comp	Ellis-Cross
Total	35,500		
OHIO			
Canfield Oil Co., Cleveland	1,200	Lub	
Craig Oil Co., Toledo	1,500	SL&A	
Myer Oil & Gas Co., Pomeroy	100	S	
National Refining Co., Findlay	1,500	Comp	National
National Refining Co., Marietta	500	Wax	National
Ohio Refining Co., Cincinnati	1,700	S&C	Ohio
Paragon Refining Co., Toledo	8,000	S&L	
Pure Oil Co., Heath	4,000	S&C	Cross
Rajah Oil & Ref. Co., Youngstown	400	S	
Solar Refining Co., Lima	12,000	S&C	Burton-Cross
Standard Oil Co. (Ohio), Cleveland	7,500	Comp	Burton
Standard Oil Co. (Ohio), Toledo	10,000	S&C	Burton
Stellar Refining Co., Newark	1,000	S&C	Leamon
Superoil Co., Toledo	200	Lub	
Sun Oil Co., Toledo	3,000	SL&C	
Total	52,600		
OKLAHOMA			
Anderson-Prichard Oil Corp., Cyril	1,000	S	
Barnsdall Refineries, Inc., Barnsdall	5,000	S&C	Cross
Barnsdall Refineries, Inc., Okmulgee	6,000	S&C	Cross
Bell Oil & Gas Co., Grandfield	3,000	S	
Bolene Refining Co., Enid	5,000	S&C	Jenkins
Cameron Refining Co., Ardmore	4,000	S	
Canfield Refining Co., Yale	500	S&L	
Champlin Refining Co., Enid	16,000	SL&C	Cross
Continental Oil Co., Sapulpa	7,000	SL&C	Cross
Cushing Refining & Gasoline Co.	3,000	S	
Cushing Refining & Gasoline Co.	1,500	S	
Empire Refineries, Inc., Cushing	7,000	Wax	Doherty
Empire Refineries, Inc., Okmulgee	3,000	Wax	Doherty
Empire Refineries, Inc., Ponca City	6,500	S&C	Doherty
Garber Refining Co., Garber	3,000	S	
Gilmer Refining Co., Ringling	1,200	S	
Globe Oil & Ref. Co., Blackwell	5,000	S&C	Cross
Hewitt Refining Co., Hewitt	1,800	S	
Illinois Oil Co., Cushing	3,000	S	
Imperial Refining Co., Ardmore	6,000	S&C	Dubbs
Independent Oil & Gas Co., Okmulgee	1,800	SL&C	Jenkins
Interocean Oil Co., Bristow	2,500	S	
Johnson Oil Refining Co., Cleveland	5,000	S&C	Dubbs
Marland Refining Co., Ponca City	25,000	Wax	Dubbs, Cross & Fleming
Mid-Continent Petroleum Corp., West Tulsa	40,000	Comp	Mid-Continent
Miller Brothers Ranch, Marland	100	S	
Oil State Refining Co., Enid	2,000	S	
Peppers Gasoline Co., Covington	1,000	S	
Pierce Petroleum Corp., Sand Springs	8,000	Wax&C	Cross
Pontotoc Pipe Line & Ref. Co., Allen	1,500	S	
Producers & Refiners Corp., West Tulsa	7,000	S&C	Dubbs
Pure Oil Co., Ardmore	6,500	S&C	Dubbs
Pure Oil Co., Muskogee	5,000	Wax&C	Cross
Riley Petroleum Co., Bristow	500	S	
Rock Island Ref. & Pipe Line Co., Duncan	2,500	S	
Roland Oil Co., Bristow	1,500	S	
Sayre Oil & Ref. Co., Sayre	500	S	
Sinclair Refining Co., Muskogee	1,000	S&L	
Shaffer Oil & Ref. Co., Cushing	10,000	Comp	Dubbs
Sun Co. of Oklahoma, Yale	3,000	S	
The Texas Company, West Tulsa	10,000	Comp	Holmes-Manley
Texas & Pacific Coal & Oil Co., Wynnewood	2,500	S&C	Dubbs
Tidal Refining Co., Drumright	7,000	S&C	Burton
Transcontinental Refining Co., Bristow	6,000	S&C	Slagter
Transcontinental Refining Co., Boynton	2,500	SL&C	Slagter
Tonkawa Petroleum Co., Tonkawa	2,500	S	
Western Oil Corp., Beckett	1,500	S	
Yale Oil Corp., Yale	1,500	S	
Total	246,900		
PENNSYLVANIA			
American Oil Works, Titusville	800	SL&C	Fleming
Atlantic Refining Co., Franklin	7,000	Comp	Lewis & Cross
Atlantic Refining Co., Philadelphia	50,000	Comp	Lewis & Cross
Atlantic Refining Co., Pittsburgh	5,000	Comp	Lewis
Bradford Oil Refining Co., Bradford	1,000	S	
Butler County Oil Ref. Co., Butler	800	L&C	Snodgrass
Canfield Oil Co., Coraopolis	800	S&L	
Carnegie Refining Co., Carnegie	1,000	L	
Chippewa Oil Co., Bridgewater	200	S&L	
Conewango Refining Co., Langdale	2,400	S&L	
Conewango Refining Co., Warren	1,900	S&L	
Continental Refining Co., Oil City	1,000	Wax	
Crew Levick Co., Titusville	2,000	Wax	
Crystal Oil Works, Oil City	1,000	L	
Daugherty (W. H.) & Son Ref. Co., Petrolia	500	S&L	
Emery Manufacturing Co., Bradford	2,000	L	
Emlenton Refining Co., Emlenton	800	L&C	Snodgrass
Empire Oil Works, Inc., Oil City	1,000	Comp.	
Franklin Creek Refining Corp., Franklin	600	L	
Franklin Quality Refining Co., Franklin	700	S&L	
Freedom Oil Works Co., Freedom	1,500	L	
Freedom Oil Works Co., Coraopolis	500	L&C	Dubbs
Independent Refining Co., Oil City	1,200	Comp	Snodgrass
Island Petroleum Co., Neville Island	1,000	Comp	Snodgrass
Kendall Refining Co., Bradford	1,000	Comp	Dubbs
Lucinda Refining Co., Lucinda	500	S	
McKean County Refining Co., Farmers Valley	1,000	SL&C	
A. D. Miller Sons Co., Pittsburgh	1,000	SL&C	Miller
Mutual Refining Co., Warren	500	L&C	Snodgrass
Neoline Oil Refining Co., East Butler	1,000	Wax	
North Penn Refining Co., Tiona	500	S&L	
Oil Creek Refining Co., Titusville	1,000	S&L	
Pennsylvania Oil Products Co., Eldred	1,000	W	
Pennsylvania Refining Co., Karns City	800	L	
Pennzoil Co., Rouseville (2 plants)	4,000	L&C	Fleming
Pure Oil Co., Marcus Hook	8,000	SL&C	Cross
Pure Oil Co., Warren	1,500	S&L	
Seneca Oil Works, Warren	560	L&C	Snodgrass
Sinclair Refining Co., Marcus Hook	12,500	C	Isom
Levi Smith Refining Co., Clarendon	500	S&L	
Starlight Refining Co., Karns City	100	S	
Sun Oil Co., Marcus Hook	15,000	Comp	Cross
Superior Oil Works, Warren	400	L	
The Texas Company, Marcus Hook	2,500	A	
Tidioute Refining Co., Tidioute	800	L	
Tiona Refining Co., Clarendon	1,000	Wax	
Titusville Oil Works, Titusville	1,000	S&C	Fleming
United Refining Co., Warren	1,000	L	
Warren Refining Co., Warren	1,000	Wax	
Warr-Penn Refining Co., Warren	400	L	
Waverly Oil Works, Pittsburgh	800	Wax&C	Cross
Waverly Oil Works, Coraopolis	3,000	S	
Wilburine Oil Works, Warren	800	Wax	
Total	147,500		
RHODE ISLAND			
Standard Oil Co. (N. Y.), E. Providence	10,000	SA&C	Cross
The Texas Company, Providence	2,500	A	
Total	12,500		

HOPE

ENGINEERS & CONTRACTORS IN NATURAL GAS AND OIL

HOPE

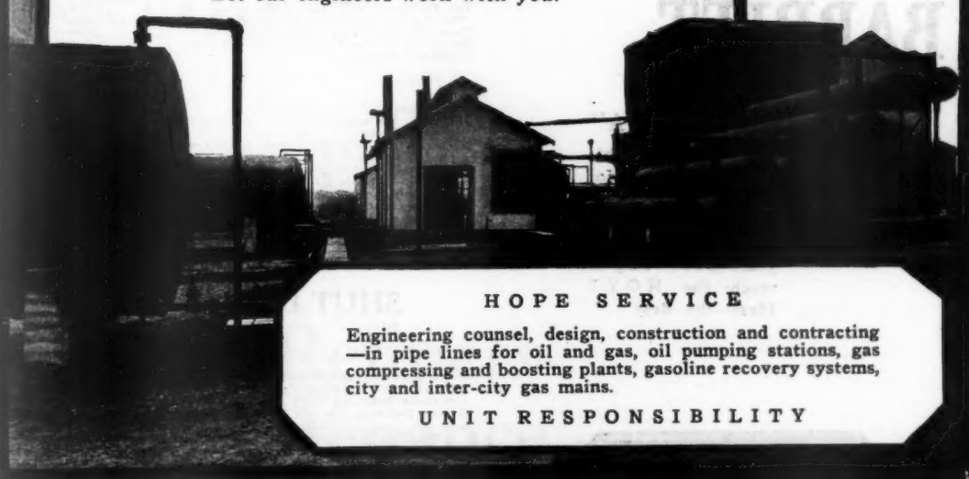
GASOLINE EXTRACTION PLANTS *with a PLUS Value*

When you place the construction of your gasoline extraction plant in the hands of the Hope Company, you will benefit by an experience in this specialty which covers the history of the industry.

You will secure a complete operating plant that incorporates this experience and that is covered by a "unit responsibility"—not simply an unrelated assembly of purchased materials and equipment.

Records made by Hope-designed and Hope-built gasoline plants everywhere, justify the statement that Hope experience in this specialty assures a producer the most gasoline per dollar of plant investment, at least cost per gallon.

Let our engineers work with you.



HOPE SERVICE

Engineering counsel, design, construction and contracting—in pipe lines for oil and gas, oil pumping stations, gas compressing and boosting plants, gasoline recovery systems, city and inter-city gas mains.

UNIT RESPONSIBILITY

H-2

ENGINEERS CONTRACTORS

HOPE Engineering & Supply COMPANY

DESIGNERS MANUFACTURERS

MT. VERNON, OHIO, U. S. A.

A Half Century of Undisputed Leadership

HOYT SOLDER

The perfect result of more than half a century's research and practical experimentation, backed by the guarantee of a nationally known institution, and stamped with its exact proportions every twelve inches. HOYT SOLDER takes all the "guess" out of soldering operations.

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GENUINE "A"

The best possible babbitt metal for every bearing condition — also evolved through more than 50 years' striving to reach the HOYT Ideal—the Best.

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Super-care in selection of base metals, plus HOYT methods of amalgamation, has produced a babbitt-metal that will give you *exceptional* service.

You can't go wrong on a HOYT Product. To get *best* results, send for descriptive literature and order after reading it.

There's a HOYT for every metal purpose.

HOYT METAL COMPANY
ST. LOUIS
NEW YORK—CHICAGO—DETROIT

F

SOUTH CAROLINA

Company, plant location—	Daily Cap. (Bbls.)	Type of Plant	Type of Cracking Process
Standard Oil Co. (N. J.), Charleston	10,000	SC&A	Burton & Tube & Tank

TEXAS

Amarillo Refining Co., Amarillo	5,000	S	
American Refining Co., Wichita Falls	7,000	S&C	Dubbs-Cross
Big Four Refining Co., Panhandle	1,500	S	
Blue Ribbon Refineries, Brownwood	200	L	
Buffalo Refining Co., Sherman	500	S	
Col-Tex Refining Co., Colorado	5,000	S	
Crown Central Petroleum Corp., Houston	3,000	L	
Crystal Petroleum Co., Burkburnett	1,000	S	
Dale Oil & Ref. Co., Electra	3,000	S	
Deepwater Oil Refineries, Inc., Harrisburgh	2,500	L	
Falls Refining Co., Wichita Falls	1,500	S	
Freeport Asphalt Co., Freeport	10,000	A	
Galena Signal Oil Co., Galena	10,000	L&C	Burton
Grayburg Oil Co., San Antonio	2,500	S&C	Fleming-Dubbs
Gulf Refining Co., Fort Worth	10,000	S&C	Gulf & McAfee
Gulf Refining Co., Port Arthur	110,000	Comp	Gulf & McAfee
Hagaman Refining Co., Tiffin	1,500	S	
Humble Oil & Ref. Co., Baytown	50,000	SC&L	Tube & Tank
Humble Oil & Ref. Co., Burkburnett	4,000	S&C	Tube & Tank
Iowa Park Producing & Ref. Co., Iowa Park	2,500	S	
Elliot Jones & Co., San Antonio	4,000	SC&L	Holmes-Manley
Keen & Woolf Oil Co., Clinton	1,500	L	
Kent-Middleton Refining Co., Corsicana	2,500	S&C	Richey
Magnolia Petroleum Co., Beaumont	50,000	Comp	Burton & Cross
Magnolia Petroleum Co., Fort Worth	10,000	S	
Magnolia Petroleum Co., Corsicana	5,000	S	
Magnolia Petroleum Co., Luling	1,000	S	
Magnolia Petroleum Co., Magnetco	16,000	S	
Megargel Refining Co., Megargel	1,500	S	
Miller Petroleum Co., Wichita Falls	3,000	S&C	Cross
Misko Refineries, Inc., Laredo	1,200	L	
Noble Oil & Gas Co., Burkburnett	3,500	S	
Olney Oil & Ref. Co., Olney	1,200	S	
Orient Petroleum Co., Wichita Falls	2,000	S	
Oriental Refining Co., Dallas	6,000	S	
Oriental Refining Co., Dallas	4,000	S	
Panhandle Refining Co., Wichita Falls	4,000	S&C	Dubbs
Pioneer Oil & Ref. Co., San Antonio	1,200	S&L	
Primrose Refining Co., Wichita Falls	1,500	S	
Producers Refining Co., Gainesville	5,000	S&C	Doherty
Pure Oil Co., Smith's Bluff	20,000	S&C	Cross
Rio Grande Oil Co., El Paso	2,500	S	
Simms Oil Co., Dallas	4,500	S&C	Cross
Sinclair Refining Co., Houston	18,500	C&L	Isom
Southern Refining Co., Somerset	2,000	SL&C	Fleming
Star Refining & Prod. Co., Fort Worth	1,500	S&C	Fleming
Sullivan Refineries, Inc., Panhandle	1,800	S	
Terminal Oil & Ref. Co., Houston	10,000	S&C	Jenkins
The Texas Company, Port Arthur	50,000	Comp	Holmes-Manley
The Texas Company, Port Neches	20,000	A	
The Texas Company, West Dallas	15,000	S&L	
Texas Mexican Oil & Ref. Co., Laredo	500	L	
Texas Pacific Coal & Oil Co., Fort Worth (building)	5,000	S&L	
Tidal Western Oil Corp., Burkburnett	2,500	S	
Texhoma Oil & Ref. Co., Wichita Falls	7,000	S&C	Dubbs
Transcontinental Refining Co., Fort Worth	5,000	SL&C	Slagter
Waggoner Refining Co., Electra	3,400	S	
White Eagle Oil & Ref. Co., Fort Worth	5,000	S&C	Holmes-Manley
Wilson Brothers Ref. Co., Wichita Falls	2,500	S	
Total	531,500		

UTAH

Diamond Oil Co., Virgin	250		
Utah Oil Refining Co., Salt Lake City	4,500	SL&C	Burton
Total	4,750		

VIRGINIA

The Texas Company, Norfolk	2,500	A	

WEST VIRGINIA

Elk Refining Co., Falling Rock	1,000	S&L	
Ohio Valley Refining Co., St. Marys	1,000	Comp	
Pure Oil Co., Cabin Creek Junction	3,000	S&L	
Standard Oil Co. (N. J.), Parkersburg	4,000	L&C	Burton & Tube & Tank
Tri-State Refining Co.	1,200	S	
Total	10,200		

WYOMING

Continental Oil Co., Glenrock	10,000	S&C	Burton
Midwest Refining Co. and Standard Oil Co. (Ind.), Casper	50,000	Comp	Burton
Midwest Refining Co. and Standard Oil Co. (Ind.), Greybull	14,000	A&C	Burton
Midwest Refining Co. and Standard Oil Co. (Ind.), Laramie	4,000	S&C	Burton
Osage Upton Oil Co., Osage	300	S	
Producers & Refiners Corp., Parco	10,000	SL&C	Dubbs
The Texas Company, Casper	6,000	Comp	Holmes-Manley
White Eagle Oil & Ref. Co., Casper	3,000	S&C	Holmes-Manley
Total	97,300		

SHUT-DOWN PLANTS BY STATES

ARKANSAS

Company, plant location—	Daily Cap. (Bbls.)	Type of Plant	Type of Cracking Process
Arkansas Oil Refining Corp., Fort Smith	2,000	S	
Arkansas Refining Corp., Little Rock	500	S	
Grison Refining Co., El Dorado	750	S	
Total	3,250		

CALIFORNIA

Associated Oil Co., Gaviota	5,000	Top	
Big Four Refining Co., Long Beach	800	Top	
California Refining Co., Long Beach	2,000	Top	
Capitol Crude Oil Co., Santa Paula	200	Top	
Commercial Refining Co., Hynes	2,000	Top	
Crescent Refining Co., Los Angeles	750	Top	
Crystal Oil Co., Vernon	500	Top	
Crystal Petroleum Producing Co., Hynes	2,500	Top	
Comet Oil Co., Vernon	3,500	Top	
Globe Refining Co., Los Angeles	1,500	Top	
Golden State Refineries, Inc., Long Beach	2,500	Top	
Harbor Refining Co., Los Angeles	2,000	Top	
Hart Dearing Refining Co., Fellows	3,000	Top	
Holly Oil Co., Huntington Beach	3,000	Top	
King Refining Co., Kern River	500	S&A	
Mercury Refining Co., Los Angeles	400	S	
Mutual Refining Co., Huntington Beach	500	S	
Orange Belt Oil Refining Co., Orange	200	S	
Paraffin Co., Inc., Emeryville	1,100	A	
Peacock Refining Co., Los Angeles	2,000	S	
Perfection Refining Co., Hynes	1,000	Top	
Producers Refining Co., Kern River	500	L	
Seaboard Petroleum Corp., Los Angeles	2,000	S	
Sierra Oil & Ref. Co., Oxnard	1,000	S&L	
Sentinel Oil Co., Los Angeles	1,000	S	
Universal Refining Co., Long Beach	1,000	S	
Union Oil Co. of Calif., Avila	10,000	Top	
Western Refining Co., Wilmington	3,000	T	
Wilmington Petroleum Corp., Wilmington	500	L	
Total	53,950		

ILLINOIS

Argo Oil Corp., Blue Island	2,500	S	
Indiahoma Refining Co., E. St. Louis	6,000	S	
Inter-Ocean Refining Co., McCook	5,000	S&L	
Joliet Refining Co., Joliet	1,000	S	
Martin Oil & Refining Co., Osborne	1,000	L	
Total	15,500		

ne Plant Service Includes:

s Plants with Power Units

—

Compressors
essor Engines
densing Sections
d Fittings
ruction Material

—

s Specializing in Refinery
ction and Maintenance

HE
L SUPPLY
ANIES

Foxboro Orifice Meter and Recording Thermometer installed at Amerada Gasoline Plant, Papoose Field, Okla.

Physically Able to Endure

The float of a Foxboro Orifice Meter is made of machined steel.

The low-pressure mercury chamber is formed from cold drawn seamless steel tubing.

The float chamber is machined from solid steel bar stock.

The high pressure chamber is a drop steel forging.

All parts are rust-proof.

No mercury can blow past the check valves.

The actuating movement of the static gauge will not fatigue, split or leak even when subjected to excess pressures.

The Foxboro Orifice Meter does not cover up or amplify the most violent pulsations in the gas line. Its mechanism is perfectly balanced. It produces a clean, legible record of static and differential pressures of a guaranteed accuracy.

The Foxboro Orifice Meter is scientifically accurate and is physically able to endure many campaigns in the oil and gas fields. If you want this fighter to work for you get in touch with our Tulsa office or write for Bulletin 113-1.

The Foxboro Co., Inc.

Neponset Avenue, Foxboro, Mass., U. S. A.

205 So. Cheyenne Avenue, Tulsa, Okla.

New York Chicago Boston Philadelphia Pittsburgh
Cleveland Rochester Atlanta Los Angeles
San Francisco Portland, Ore.

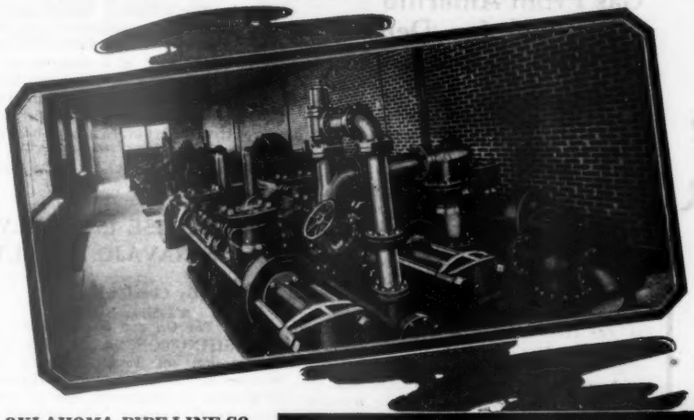
FOXBORO

REG. U. S. PAT. OFF.

THE COMPASS OF INDUSTRY

Company, plant location—	Daily Cap. (Bbls.)	Type of Plant	Type of Cracking Process
INDIANA			
Portland Oil & Ref. Co., Portland	600	S&C	Fleming
Interstate Gasoline Co., E. Chicago	2,500	S&C	Greenstreet
Power Plus Oil Co., Columbus	1,200	S	
Vincennes Refining Co., Vincennes	500	S&L	
Total	4,800		
IOWA			
Omaha Refining Co., East Omaha	1,500	S&C	Cross
KANSAS			
Continental Oil Co., Chanute	2,000	S&L	
Chemical Oil & Gas Co., Osawatomie	1,000	S	
Gordon Refining Co., Florence	1,000	S	
Grant Oil Co., Augusta	2,500	S&C	Jenkins
Industrial Refining Co., El Dorado	1,000	S	
Kansas City Asphalt & Road Oil Co., Kansas City	1,000	A	
K-T Oil Corp., Wichita	1,000	S	
Lesh Refining Co., Arkansas City	2,000	S	
Red Bird Refining Co., Fredonia	200	S	
Richardson Refining Co., El Dorado	1,500	S	
United Oil & Ref. Co., Hutchinson	2,500	S	
Total	15,700		
KENTUCKY			
Carnahan Oil & Ref. Co., Creelsboro	200	S	
Central Producing & Ref. Co., Bowling Green	600	S	
Cumberland Producing & Ref. Co., Burkesville	140	S	
Fayette Refining & Storage Co., Lexington	500	S	
Glasgow Oil & Ref. Co., Glasgow	600	S	
Great Southern Refining Co., Lexington	2,500	S&L	
Neha Refining Co., Lexington	800	S	
Passaic Oil & Ref. Co., Franklin	500	S	
Total	5,840		
LOUISIANA			
Alexandria Refining Co., Alexandria	600	S&C	
Delart Refining Co., Lafayette	300	S	
Gulf Coast Refining Co., Good Hope	10,000	S&A	
International Oil & Gas Corp., Cedar Grove	1,000	L	
Lewis Oil Corp., Shreveport	1,000	S	
Red River Refining Co., Crichton	1,800	S	
Solar Gasoline Co., Shreveport	1,000	S	
Union Refining & Pipe Line Co., Homar	1,000	S	
Total	16,700		
MARYLAND			
United States Asphalt Refining Co., Baltimore	5,000	A	
MINNESOTA			
Pure Oil Co., Minneapolis	1,000	S&L	
MISSOURI			
Interstate Refineries, Inc., Kansas City	2,000	S&L	Muehl
St. Joseph Viscosity Oil & Ref. Co., St. Joseph	500	S	
Total	2,500		
MONTANA			
American Refining Co., Great Falls	1,000	S	
Big West Oil Co., Kevin	250	S	
Montana Refining Co., Billings	750	S	
Total	1,970		
NEW JERSEY			
Karitan Refining Corp., New Brunswick	5,000	S	
OHIO			
Akron Oil Refining Co., Akron	750	S	
OKLAHOMA			
Acme Refining & Pipe Line Co., Jennings	1,000	S	
Buffalo Refining Co., Yale	500	S	
Carter Oil Co., Cartoco	16,000	S	
Chestnut & Smith Corp., Sand Springs	5,000	S	
Coleman Nelson Corp., West Tulsa	1,500	S	
Coleman Nelson Corp., Haskell	1,000	S	
Constant Refining Co., West Tulsa	2,500	S	
Daisy Belle Petroleum Co., Wilson	2,000	S	
Empire Refineries, Inc., Oklahoma City	2,000	S	
Inland Refining Co., Cushing	1,000	S	
Lawton Refining Co., Lawton	1,000	S	
Mid-Co Gasoline Co., W. Tulsa	4,500	S&L	
Newkirk Oil & Ref. Co., Newkirk	2,000	S	
Nyanza Refining Co., Wilson	2,500	S	
Oil State Refining Co., Enid	1,800	S	
Oil State Refining Co., Allen	800	S	
Oklahoma Texas Refining Co., Grandfield	2,000	S	
Pauline Refining Co., Hampton	1,200	S	
Producers & Refiners Corp., Blackwell	3,000	S	
Producers & Refiners Corp., Sapulpa	2,000	S	
Pure Oil Co., Cushing	6,500	S	
Red Seal Refining Corp., Oklahoma City	2,000	S	
Santa Fe Oil & Ref. Co., Ardmore	5,000	S	
Sinclair Refining Co., Cushing	6,000	S	
Sayre Oil & Ref. Co., Sayre	500	S	
Turley Petroleum Co., Oklahoma City	2,500	S	
Wagoner Refining Co., Wagner	300	S	
Westheimer & Daube Healdton	1,000	S	
Total	77,100		
PENNSYLVANIA			
Beaver Refining Co., Washington	200	S	
Crew Levick Co., Warren	900	Wax	
Lyons Refining Co., Clarendon	1,000	S&L	
Lakeside Oil Refining Co., Franklin	400	S&L	
Viking Oil Co., Stoneham	200	L	
White Oil Corp., Clarendon	1,000	L	
Total	3,700		
TENNESSEE			
Gillespie Oil Corp., Gallatin	250	S	
Nashville Oil Co., Nashville	500	S	
Total	750		
TEXAS			
Abilene Refining Co., Abilene	400	S	
American Oil Co., Pioneer	1,200	S	
Associated Producing & Ref. Co., Bridgeport	1,000	S	
Boardman Oil Co., Wichita Falls	750	S	
Bear Refining Co., Burkburnett	1,000	S	
Bridgeport Refining Co., Bridgeport	800	S	
Brownwood Producing & Ref. Co., Brownwood	200	S	
Cisco Refining Co., Cisco	5,000	S	
Corsicana Oil & Ref. Co., Corsicana	400	L	
De Leon Pipe Line & Ref. Co., De Leon	1,500	S	
Denison Oil & Ref. Co., Denison	1,000	S	
Four States Refining Co., Texarkana	700	S	
Graham Refining Co., Graham	1,200	S	
Houston Terminal Refining Co., Houston	3,500	S	
Humble Oil & Refining Co., Houston	8,000	S	
Interstate Gasoline Co., Iowa Park	2,500	S	
Interstate Refineries, Inc., Tiffin	2,000	S	
Interstate Refineries, Inc., Ranger	2,000	S	
Kent Middleton Refining Co., Minerva	1,500	S	
Lewis Oil Corp., Burkburnett	1,200	S	
Lewis Oil Corp., Comanche	1,000	S	
Lone Star Refining Co., Wichita Falls	3,500	S	
Mexia Oil & Ref. Co., Mexia	500	S	
National Refining Co. of Texas, Greenville	2,000	S	
Oriental Oil Co., Dallas	1,200	S	
Paterson Oil Co., Brownwood	1,000	S	
Peerless Refining Co., Wortham	2,000	S	
Petroleum Corp., Electra	1,500	S	
Pierce Petroleum Corp., Fort Worth	8,000	S	
Pierce Petroleum Corp., Texas City	5,000	S	
Ranger-Wichita Oil & Ref. Co., Wichita Falls	3,000	S	
Skelly Oil Co., Burkburnett	2,000	S	
Southwestern Refining Co., Sour Lake	1,000	L	
South Bosque Refining Co., South Bosque	1,000	S	
Sunshine Consolidated Oil Co., Wichita Falls	3,000	S	
Swastika Oil & Ref. Co., Cliney	2,000	S	
Sweetwater Refining Co., Sweetwater	500	S	
Trans-Atlantic Petroleum Co., Houston	1,000	S	

GOULDS



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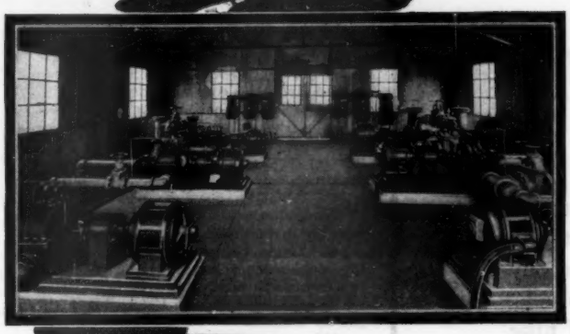

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Oil Pump House—7 Goulds Triplex Pumps.

Circulating Naphtha in Compressor System—1 Goulds Triplex Pump.

Cesspool—1 Goulds "Pyramid" Pump.

Circulating Oil Over Reflexes on Still Tower—1 Goulds Centrifugal Pump, single-stage, single-suction, enclosed impeller type.

Water Supply—1 Goulds Centrifugal Pump, single-stage, double-suction.

Cracking Distillate for Cross Units—2 Goulds Centrifugal Pumps, single-stage, double-suction.

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Pumping Mineral Seal Oil Through Absorbers—3 Goulds Centrifugal Pumps, three-stage. Oil 36 degrees Beaume, 120 degrees Fahrenheit.

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Lone Star Gas Company
Humble Pipe Line Company
The Gulf Pipe Line Company
Associated Pipe Line Company

The Eclipse Paint & Mfg. Co.
Cleveland, Ohio, U.S.A.

Dallas Detroit Philadelphia San Francisco
Denver Newark Pittsburgh Charlotte, N. C.

Company, plant location—	Daily Cap. (Bbls.)	Type of Plant	Type of Cracking Process
Waco Refining & Pipe Line Co., E. Waco	2,500	S	
Yuba Refining Co., Nacagdoches	150	S	
Total	77,700		
WYOMING			
Alliance Oil & Ref. Co., Thermopolis	1,500	S	
Clay Spur Refining Co., Clay Spur	200	S	
Continental Oil Co., Cowley	3,000	S	
Lovell Refinery, Lovell	600	S	
United States Oil & Ref. Co., Osage	1,000	S	Cross
Wyatt Oil & Ref. Co., Fetterman	300	S	
Total	6,600		

Gas From Amarillo Planned for Denver By 360-Mile Line

DENVER, Colo., May 1.—To supply Denver and southern Colorado with natural gas from the Amarillo Field in the Texas Panhandle is the purpose of a $12,000,000 plan under way between officials of the Public Service Co. of Colorado and M. E. Young, vice president of the New York Oil Co., it was made known here.

Mr. Young arrived in Denver to talk with local officials regarding the project and, while officials declined to comment on the actual status of the negotiations, it was revealed that, if the project goes through natural gas from the Texas field will be available here next winter.

According to engineers a new era of manufacturing growth would be opened in Denver through the bringing here of natural gas. It would be almost as important an asset to Pueblo, for at least a part of the operations of the Colorado Fuel & Iron Co. could be conducted with gas heat, a fuel used in some of the steel mills in Pennsylvania.

The project would be a huge one, calling for the construction of a 360-mile pipe line tapping the great gas resources of the Amarillo Field to serve Denver, Pueblo and other southern Colorado cities, possibly including Colorado Springs.

Mr. Young refused to give details of the plan, stating only that the company, represented through him, was negotiating with the Public Service Co. to bring the gas to Denver.

"When negotiations are completed we will make public our complete plans, but that would be premature at this time," he said.

Preliminary estimates, already worked out by engineers, places the cost of a gas line such as the project calls for at approximately $12,000,000. Virtually no additional investment would be required in Denver, as the gas would be put into the present distributing system of the Public Service Co.

Denver at present is consuming approximately 9,500,000 feet of gas daily, while on peak days the total reaches 13,000,000 to 14,000,000 feet.

The question of a franchise for sale of the gas in Denver is believed to be one of the factors which must be dealt with before the negotiations can be completed. The present Public Service franchise expires May 15. Engineers for both the company and the city are engaged in valuation work on the company plant in preparation for a new franchise which will possibly be submitted to the voters this summer.

Mr. Young declared that the holdings of the Amarillo Field had already been obtained. "There are several individual wells that will produce enough to take care of all of Denver's needs for years to come," he said. "By connecting with all the wells already drilled there is enough gas to take care of an unlimited population. The field, it is estimated conservatively, will last for at least 50 years."

According to the engineers' report, the gas in the Amarillo Field is of high quality. Amarillo is already using the gas for domestic and industrial purposes.

ARGENTINE OPERATIONS

The Argentine Government reserve of 5,000 kilometers at Comodoro Rivadavia is located in the territory of Chubut on the Atlantic Ocean, whence transportation is carried on by tank steamers to La Plata, where the government refinery is located. The following improvements are being made: Construction of an electric power plant with a number of substations; installation of a compressor plant for the utilization of the gas; installation of a plant for the manufacture of lubricants; extension of the pier at Comodoro Rivadavia to care for heavy tonnage brought from Buenos Aires; two new tanks of a capacity of 10,000 tons each.

COMPROMISE IS LIKELY ON NAVAJO ROYALTIES

By Charles E. Kern
Washington Bureau
The Oil and Gas Journal

WASHINGTON, D. C., May 1.—The Commission on Indian Affairs of the Senate of which Senator Harreld of Oklahoma, is chairman, met to consider the several pending bills providing for the leasing for oil and gas in the executive order Indian reservations. These reservations comprise about 22,000,000 acres of land. The main point discussed related to the disposition of the royalties. Senator Jones of New Mexico, and Senator Bratton led those who believed the states in which the reservations are located should receive 37½ per cent of the royalty, whereas Senator La Follette, of Wisconsin, and Senator Wheeler, of Montana, favored giving all the royalty to the Indians, on the ground that the President had established a precedent that should be ratified by Congress in setting aside the land by executive order for the use of the Indians.

Commissioner Burke of the Indian Office, indicated the latter position was the one the Government would espouse were it not for the fact that to dispose of this legislation a compromise is necessary so he favored 37½ per cent to the states to be used for road building and schools within these reservations, and 62½ per cent for the Indian wards.

Reference was made to the 24 leases and the 375 applications for oil drilling permits covering 2,500 acres each. The committee seemed to favor validating these applications in all instances in which some work had been done and money expended. There was less support favoring the validation of applications in respect to which no work had been done and no money expended.

Senator Jones expressed confidence there would be a great oil field developed in the Navajo reservation, which view was not generally supported. Senator Jones declared the oil that had been in the Rattlesnake structure, was the most valuable in the world, being 63 degrees Baume, it being so volatile and free from any contamination as to be used in automobiles without refining.

OIL AT WASHINGTON MEETING

A delegation representing the oil industry is expected to attend the fourteenth annual meeting of the United States Chamber of Commerce, to be held at Washington on May 11 to 13. Organizations within the industry entitled to send delegates are: American Petroleum Institute, New York; Mid-Continent Oil & Gas Association, Tulsa, Okla., Northwestern Pennsylvania Oil Producers' Association, Bradford, Pa.; Oil Trades Association of New York, New York; Western Petroleum Refiners Association, Tulsa, Okla.; American Gas Association, New York; Natural Gas Association of America, Pittsburgh, Pa.; National Gas Supply Men., Inc., Pittsburgh, Pa.; Ohio Gas and Oil Men's Association, Columbus, Ohio.

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A Roots Gas Pump for forcing still vapors through absorption tanks to the burners, or for delivering natural gas to the compressors at a definite pressure —or for any other purpose—is assurance of a minimum of trouble and expense.

The picture above shows two Roots units in operation and, as the picture was being taken, two more were being unloaded. Re-orders are the best recommendation.

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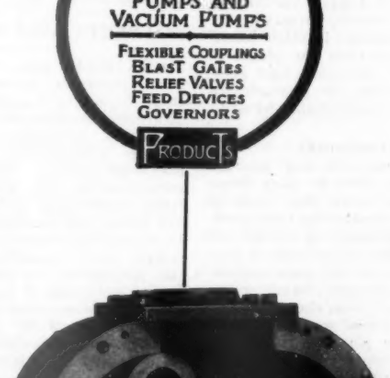

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SHOULD NOT TOLERATE CHEAP NATURAL GASOLINE

(Continued from Page 80)

this way they secure an excellent motor fuel. It is customary for refiners to put gasoline into storage through the winter months in order to handle more easily the heavy summer demand. This storage stock often loses some of its gravity or volatility and natural gasoline is used to restore it to a commercial product. It is also blended by some gasoline plants with naphtha and with low gravity gasoline which when properly produced corresponds very closely to refined gasoline.

The natural gasoline industry is in its infancy and solicits and appreciates constructive criticism and suggestions from outside agencies. It has always followed the policy and showed its willingness to cooperate with any government bureau or any refineries in working out difficulties and problems as they arise. It combats and objects most strenuously to unfair, untrue and unreliable propaganda put out against it, intentionally or otherwise. In order to inform the public correctly regarding the natural gasoline industry and its product, disinterested and highly technical and scientific men are making an investigation, the results of which will be broadcast throughout the land. If their findings are favorable, the burden of proof will naturally be thrown back upon those who have spread this misinformation. The only request the industry has to make of the general public is that it accept only facts substantiated by proof and not the ideas of people who may be prompted by selfish motives.

Invites Waste

Cheap gasoline invites waste and waste must be discouraged as the oil industry is entitled to a fair price for its product. In return it should produce the best motor fuel possible. Since the price of low volatility gasoline which is offered especially in the summer months will undoubtedly be less than the price of higher volatility products, it should not be considered as a standard either in quality or price. The general demand for higher volatility in gasoline for year around use is rapidly growing in popularity and should continue to grow.

It is believed a more uniform price throughout the year would be possible by the use of higher volatility gasoline, which would materially assist in creating a more general and uniform demand for natural gasoline which so vitally affects this industry.

Natural gasoline plants are operated in practically every field in the country and aid greatly in increasing the production of crude oil. They hold a vacuum on oil producing sand, thereby increasing the production of petroleum; in other localities the residue gas from the plants is being put back into the sand under pressure which is enabling the producers to recover production unobtainable by ordinary methods.

Operate Continually

During depressions and dull seasons, refiners are usually able to close down their plants or cut down their runs to the stills until the demand for their product strengthens sufficiently to justify full time operation. This is not true of natural gasoline plants as they must operate at full capacity continually, handling the gas as it is produced from the wells. In the past this has forced many operators of natural gasoline plants to run at a heavy loss and store their product because of market conditions. If a demand as nearly uniform as possible could be established it would not force this unjust loss on the plants and would make it impossible for other branches of the industry to stay out of the market until such time as they could buy natural gasoline below cost or at an unfair price to the natural gasoline manufacturers. We do not wish to put ourselves in the position of criticizing the refining industry which is absorbing large quantities of our product at this time and which we expect will use even greater amounts in the future. They have many perplexing problems of their own to dispose of.

Does it not seem that the government and its agencies as well as the general public has a well-defined duty to perform? Can it further delay definite action in the conservation of petroleum and its products? The natural gasoline industry has full confidence that in the very near future this issue will be met squarely and that the proper results will be obtained.

Future generations must not be permitted to suffer a petroleum shortage due to our failure to use economically our natural petroleum resources. In conclusion, let us again insist that the users of motor fuel follow their best personal interests by demanding a product containing a reasonable percentage of natural gasoline to insure volatility and by so doing play a part in the conservation of petroleum and its products and assist in maintaining a valuable industry.

CALIFORNIA RECEIPTS AND PETROLEUM IMPORTS

Imports of crude and refined oils at the principal United States ports for the week ended April 24 totaled 1,228,000 bbls., a daily average of 175,429 bbls., compared with 1,705,000 bbls., a daily average of 243,571 bbls. for the week ended April 17, and a daily average of 210,286 bbls. for the four weeks ended April 24.

	Week Ended Apr. 24
At Atlantic Coast Ports:	
Baltimore	50,000
Boston	175,000
New York	488,000
Others	144,000
Total	857,000
Daily average	122,429
At Gulf Coast Ports:	
Galveston district	161,000
New Orleans and Baton Rouge	170,000
Tampa	40,000
Total	371,000
Daily average	53,000
At All United States Ports:	
Total	1,228,000
Daily average	175,000
Daily average 4 weeks ended	210,286

Receipts of California crude and refined oils at Atlantic and Gulf Coast ports for the week ended April 24, totaled 448,000 bbls., a daily average of 64,000 bbls., against 676,000 bbls., a daily average of 96,571 bbls., for the week ended April 17 and a daily average of 83,679 bbls., for the four weeks ended April 24.

	Week Ended Apr. 24
At Atlantic Coast Ports:	
Baltimore	140,000
Boston	75,000
New York	75,000
Others	158,000
Total	448,000
Daily average	64,000
Ttl. Atlantic and Gulf Coast Ports	448,000
Daily average	64,000
Daily average 4 weeks ended	83,679

ALBERTA ASKS OIL CONTROL

CHATHAM, Ont., May 1.—The Alberta provincial government is taking steps to secure for the Alberta Public Utilities Commission control of all oil companies operating in the province, whether incorporated under federal or provincial charter. While companies incorporated in the province are under strict supervision, most new companies are taking out Dominion charters. The Dominion Government has been asked to compel such companies to come under the jurisdiction of the Alberta board. Some months ago it was announced that only companies operating in at least two provinces would be granted Dominion charters, and it is understood this ruling is to be strictly enforced.

VENEZUELAN PETROLEUM

The development of the Venezuelan oil fields is largely responsible for the marked increase in the foreign trade of the Dutch West Indies during the past three years. A British-Dutch petroleum company maintains a large refinery and storage plant at Willemstad, Curacao, which has expanded rapidly with the growing production of Venezuelan oil. A new petroleum plant is being constructed on the island of Aruba by American interests. Several tanks have already been erected and the first shipments of Venezuelan oil received.

ABSORBENT OIL FOR GASOLINE MANUFACTURE

(Continued from Page 92)

and due to the well-known difficulty of making adequate determinations using natural gas containing various amounts of natural gasoline, it is considered desirable to find the optimum equilibrium condition using natural gasoline and several naphthas of reasonably short distillation range but still of such nature that they might be easily reproduced economically The characteristics of these materials are shown in Table 6.

TABLE 6—Vapor Pressures of Natural Gasoline-Naphtha Blends

	Boiling Point Ave. °F.	Gravity °A. P. I.	Gravity Spec.	Molecular Weight	10% Natural Gas Vapor Pressure @ 60°F.
Natural gasoline	...	88.7	.6426	79	...
Naphtha No. 1	350	49.5	.7818	144	115
Naphtha No. 2	434	42.5	.8132	175	97
Naphtha No. 3	506	39.3	.8285	199	122
Naphtha No. 4	572	36.0	.8448	231	140

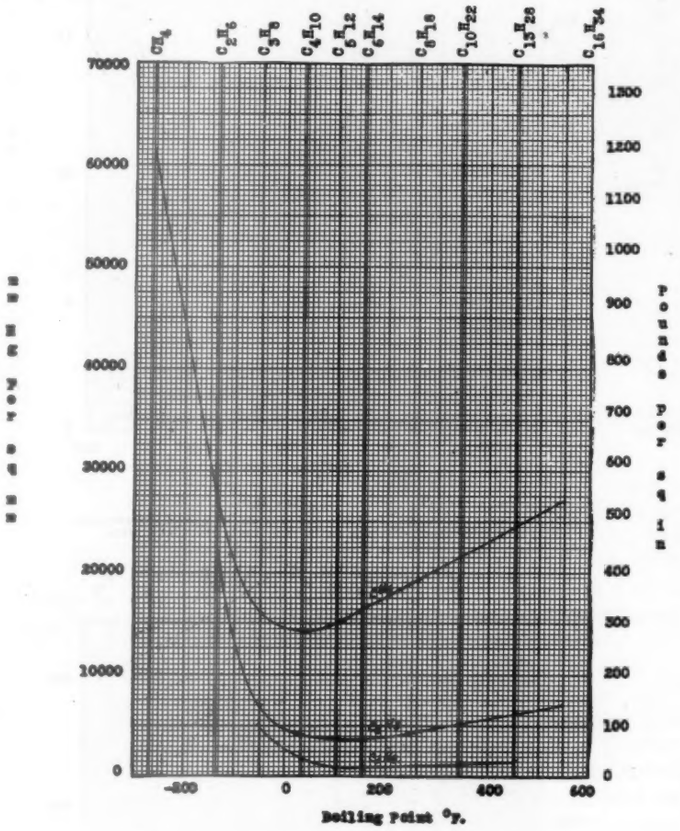

Fig. 1

Vapor pressures of methane, ethane and propane in pure hydrocarbons. Research laboratory, Empire Refineries, Inc., Okmulgee, Okla.

Vapor pressure determinations were made of blends of the natural gasoline with each of the four naphthas shown, using the static isoteniscope, taking vapor pressure readings at 60 degrees Fahrenheit. The data obtained is shown in the last column of Table 6.

A comparison made, showing butane and pentane absorbed in pure hydrocarbons is shown in Figure 5. These two hydrocarbons were chosen because the molecular weight of natural gasoline used was between the molecular weights of butane and pentane.

With equilibrium conditions, the optimum absorbent for natural gasoline with a molecular weight between butane and pentane, would probably be duodecane, while the optimum absorbent for pure butane and pentane would be octane and decane, respectively. In other words, it might be considered that under actual conditions, with the mixtures of hydrocarbons in both gas and absorbent oil, an absorbent oil of molecular weight approximately 28 units higher than that required for the pure hydrocarbons would be most suitable for use in absorbent.

Referring to Table 3 it will be observed that the average molecular weights of the natural gasolines considered were in range between methane and ethane, which would seem to reflect that since the optimum absorbent for ethane is hexane, under actual conditions the optimum absorbent for natural gas, with the concentrations given, would be a product which has an average molecular weight of octane. Octane has a boiling point of 259 degrees Fahrenheit. Let us consider the various absorbents which may include octane and the present absorbent oil with the ranges between these products, each fraction having a 100 degrees Fahrenheit distillation range. This would give us naphthas of the following ranges: 200-300, 300-400, 400-500, 500-600 degrees Fahrenheit, with approximate average boiling points of 250, 350, 450 and 550 degrees Fahrenheit, respectively. In reviewing these fractions it will be observed that even though the material of 250 degrees Fahrenheit average boiling point is most desirable from the maximum concentration of natural gasoline obtainable in the absorbent and at the same time having the best recovery it would be quite economical to use either the fraction with an average boiling point of 250 or 350 degrees Fahrenheit since these are important gasoline fractions and would undoubtedly command price out of proportion to their increase value as absorbents. This leaves the product with 450 degrees Fahrenheit average boiling point, which is of such a range that it could be very easily and economically produced so that the cost would not be out of proportion to its advantageous characteristics. It would be considered best to have the products of average boiling point of 450 degrees Fahrenheit of as short a distillation range as possible, but it is

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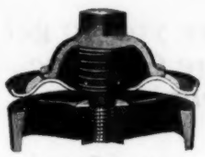
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not feasible to have a range much closer than 90-110 degrees Fahrenheit. It will be considered that this absorbent will then have a distillation range of approximately 400-500 degrees Fahrenheit, with an average boiling point of 450 degrees Fahrenheit.

Acknowledgment is made to Messrs.

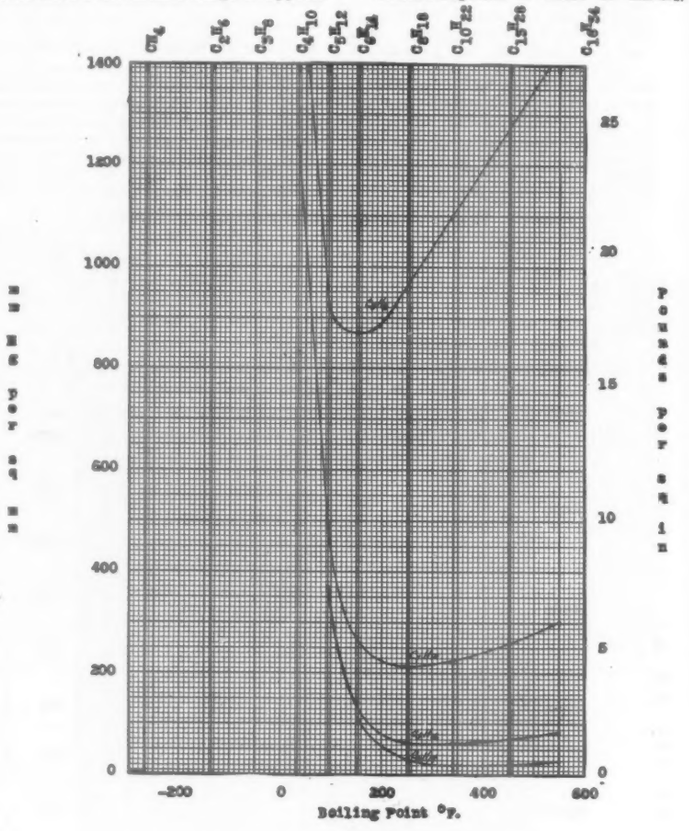


Fig. 2
Vapor pressures of butane, pentane and hexane in pure hydrocarbons. Research laboratory, Empire Refineries, Inc., Okmulgee, Okla.

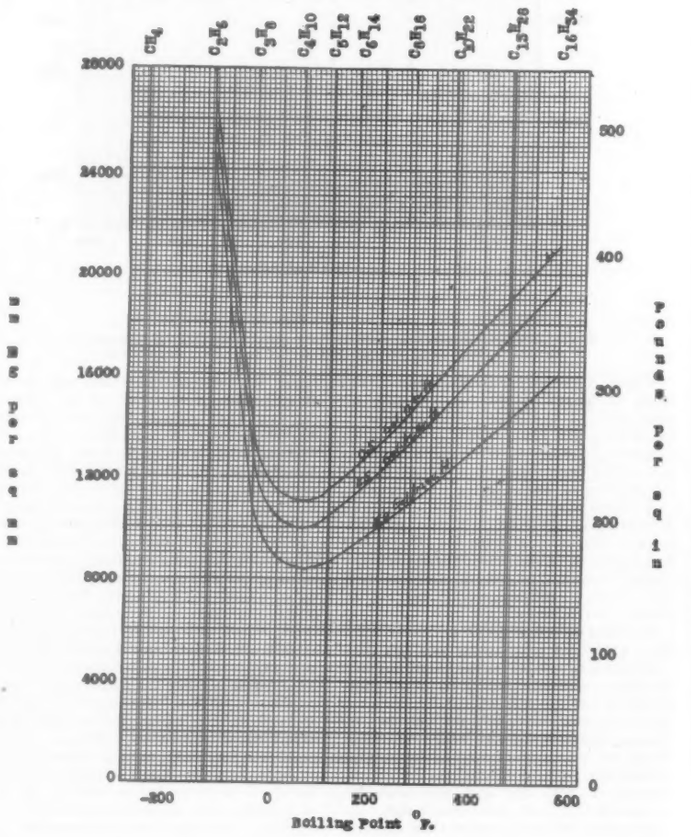
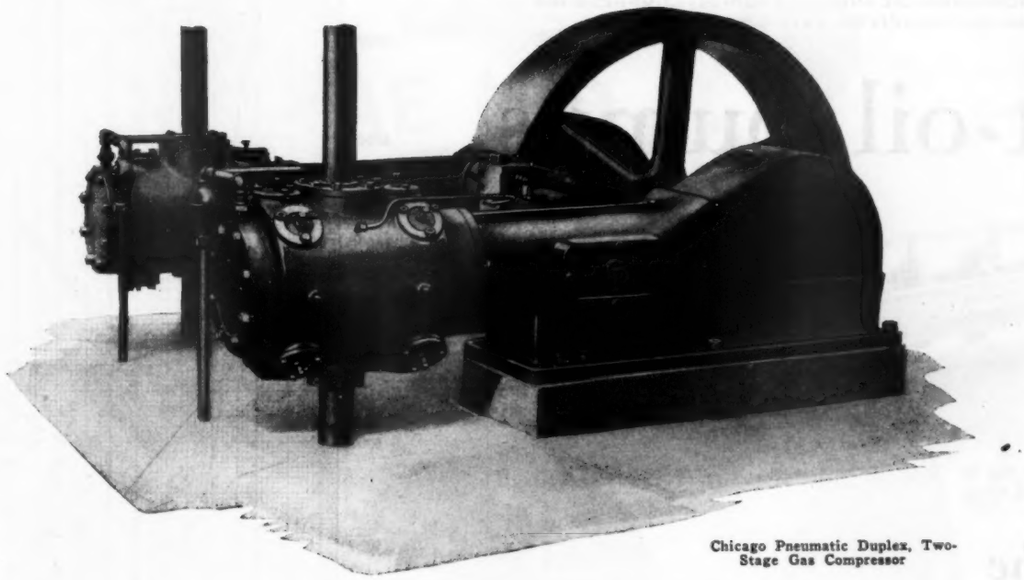


Fig. 3
Vapor pressures of natural gases in pure hydrocarbons, concentration 10 per cent. Research laboratory, Empire Refineries, Inc., Okmulgee, Okla.



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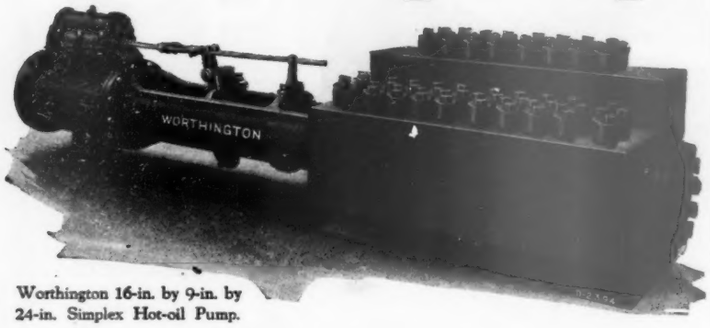

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George H. Dalhquist, J. H. Cromwell and John F. Stewart for assistance in securing original data and for the preparation of this paper.

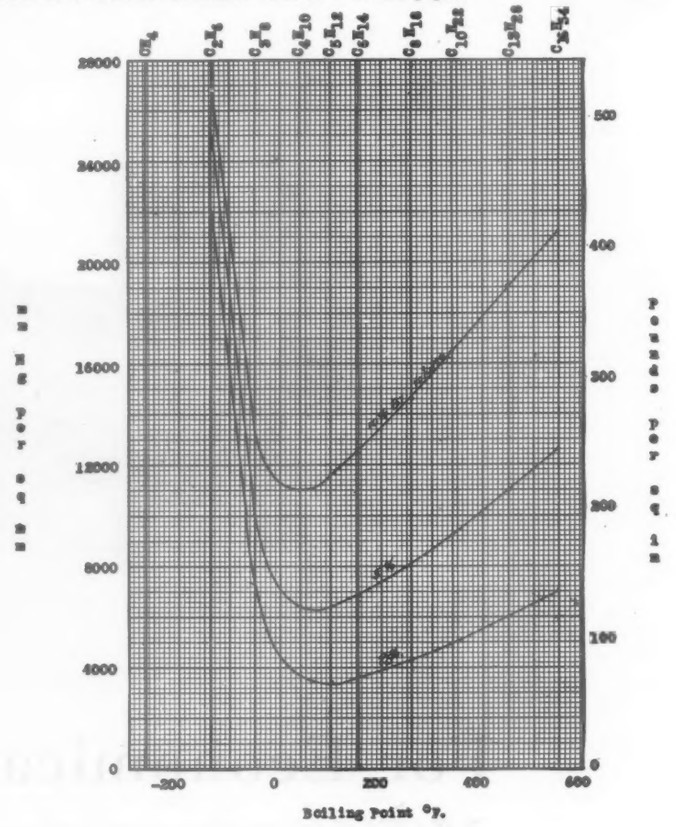

Fig. 4
Vapor pressures of natural gas in pure hydrocarbons, three concentrations. Research laboratory, Empire Refineries, Inc., Okmulgee, Okla.

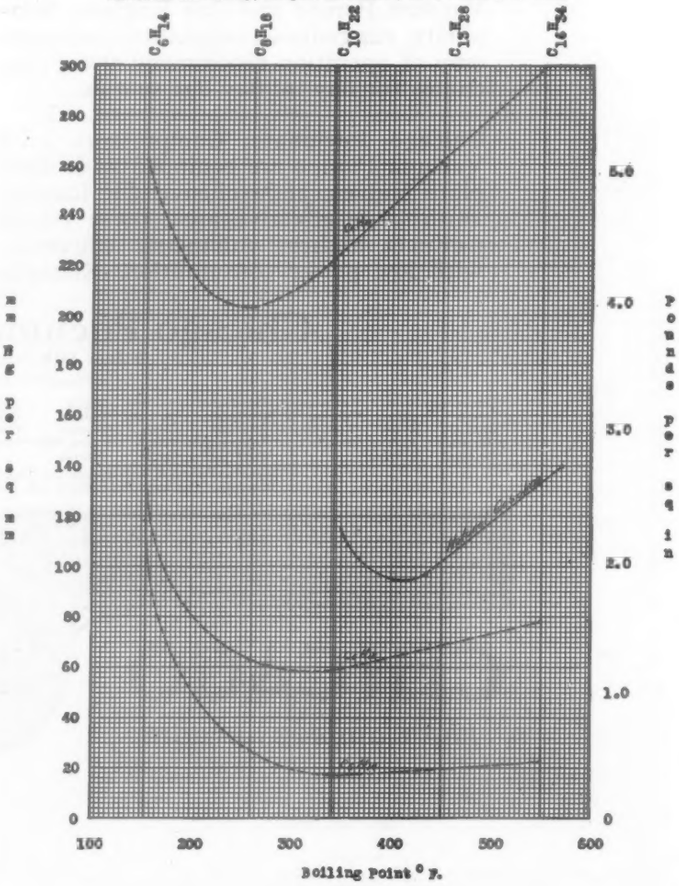

Fig. 5
Vapor pressures of natural gasoline-naphtha blends. Research laboratory, Empire Refineries, Inc., Okmulgee, Okla.

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at Sapulpa, Oklahoma, May 25, 1926

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Tank Cars Machinery
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SHIPMENTS FOR GULF PORTS DURING THE MONTH OF MARCH

HOUSTON, Tex., May 3.—Shipments by water of refinery products and crude from Gulf ports during the month of March aggregated 15,117,566 bbls., representing an increase of 1,297,503 bbls. over the February figures. The movement of refinery products, which includes fuel oil was 10,023,703 bbls., an increase of 656,671 bbls., and of crude 5,093,863 bbls., or an increase of 640,832 bbls.

The export consignments fell off 671,907 bbls. Refinery products decreased 508,593 bbls. from February and crude declined 163,314 bbls.

The Standard Oil Co. of Louisiana led all other shippers with a total of 3,456,503 bbls. of refinery products and crude. The Gulf Refining Co. ranks next with a total of 3,051,138 bbls. The Gulf Refining Co. consigned a total of 2,812,179 bbls., and The Texas Company loaded out 1,864,999 bbls. from its Port Arthur plant. The Magnolia Petroleum Co. was close behind with a total of 1,762,581 bbls.

The Sun Co. and Crown Central Petroleum Corp. are not represented in the March shipments. Both consign crude to Atlantic Coast ports.

The following table gives the refinery and crude shipments by each company:

From Port Arthur
By The Texas Company
Refined

Destination—	Gross Bbls.
Coastwise	1,372,494
Export	280,612
Total	1,653,106

Crude

Coastwise	211,893

From Port Arthur
By the Gulf Refining Co.
Refined

Coastwise	2,626,744
Export	54,197
Total	2,680,941

Crude

Coastwise	370,197

From Beaumont
By Magnolia Petroleum Co.
Refined

*Coastwise	1,762,581

*Makes no distinction between coastwise and foreign consignments.

From Atreco
By Atlantic Oil Producing Co.
Refined

Coastwise	194,173

Crude

Coastwise	376,770

From Port Arthur
By Atlantic Oil Producing Co.
Crude

Coastwise	210,544

From Smiths Bluff
By Atlantic Oil Producing Co.
Crude

Coastwise	117,361

From Neches Terminal (Orange)
By Humble Oil & Refining Co.
Crude

Coastwise	177,644

From Texas City
By Humble Oil & Refining Co.
Crude

Coastwise	607,943

From Texas City
By Marland Oil Refining Co.
Refined

Export	61,377

Crude

Coastwise	395,104

From Baytown (Refinery)
By Humble Oil & Refining Co.
Refined

Coastwise	761,465
Export	375,383
Total	1,136,848

Crude

Coastwise	836,168
Export	53,576
Total	889,744

From Houston (Sinco)
By Sinclair Oil Refining Co.
Refined

Coastwise	175,710
Export	13,802
Total	189,512

Crude

Coastwise	410,345

From Houston (Galena)
By Galena-Signal Oil of Texas
Refined

Coastwise	110,000
Export	55,000
Total	165,000

From Houston
By Deepwater Oil Refineries
Refined

Coastwise	50,000

From Baton Rouge (Refinery)
By Standard Oil Co. of Louisiana
Refined

Coastwise	1,317,018
Export	813,147
Total	2,130,165

Crude

Coastwise	1,326,338

SUMMARY

Shipments by water from Gulf ports during month of March, 1926

Company and Port—	Refined	Crude	Total
The Texas Company, Port Arthur	1,653,106	211,893	1,864,999
Gulf Refining Co., Port Arthur	2,680,941	370,197	3,051,138
Magnolia Petroleum Co., Beaumont	1,762,581	.....	1,762,581
Atlantic Oil Producing Co., Atreco	194,173	376,770	570,943
Atlantic Oil Producing Co., Port Arthur	.....	210,544	210,544
Atlantic Oil Producing Co., Smiths Bluff	.....	117,361	117,361
Humble Oil & Refining Co., Neches Terminal	.....	177,644	177,644
Humble Oil and Refining Co., Texas City	.....	607,943	607,943
Marland Oil Refining Co., Texas City	61,377	395,104	456,481
Humble Oil & Refining Co., Baytown	1,136,848	889,744	2,026,592
Sinclair Oil Refining Co., Houston	189,512	410,345	599,857
Galena-Signal, Houston	165,000	.....	165,000
Deepwater Refining Co., Houston	50,000	.....	50,000
Standard Oil Co. of Louisiana, Baton Rouge	2,130,165	1,326,338	3,456,503
Total for March	10,023,703	5,093,863	15,117,566
Total for February	9,367,032	4,453,031	13,820,063
Difference	656,671	640,832	1,297,503
Exports			
The Texas Company, Port Arthur	280,612	.....	280,612
Gulf Refining Co., Port Arthur	54,197	.....	54,197
Marland Oil Refining, Texas City	61,377	.....	61,377
Humble Oil & Refining Co., Baytown	375,383	53,576	428,959
Sinclair Oil Refining Co., Houston	13,802	.....	13,802
Galena-Signal, Houston	55,000	.....	55,000
Standard of Louisiana, Baton Rouge	813,147	.....	813,147
Total for March	1,653,518	53,576	1,707,094
Totals for February	2,162,111	216,890	2,379,001
Difference	508,593	163,314	671,907

BLAFFER SUIT DATE

AUSTIN, Tex., May 1.—Additional hearings at Houston by the commissioner to take testimony in the State's $50,000,000 suit against R. L. Blaffer and others, for recovery of land in the Humble oil field, were called Tuesday for May 8, to take testimony for the attorney general's department, and on May 10, for testimony of 13 witnesses, wanted jointly by Intervenors Perkins and Mrs. Gertrude Goldmann and 18 additional witnesses for Mrs. Goldmann and three additional witnesses for Perkins. C. J. Pickle of Austin is the commissioner to take testimony.

OIL TRACES IN NEW GUINEA

During a recent survey expedition in New Guinea on behalf of the Colonial Exploration & Development Syndicate, the Vanimo area of the Aipe district, 18 miles from the Dutch border was explored. The gray shale in that area proved to be heavily impregnated with marine fossil life and it contained unmistakable traces of petroleum. Another expedition will be sent to begin boring operations.

MEXICAN PRODUCTION TAXES

Mexican petroleum production taxes for April, 1926, are shown in the following tabulation. Figures are in pesos per cubic meter.

	March	April
Crude, 0.93 spec. grav.	3.067	3.067
Crude, 0.96 or above	1.598	1.598
Fuel oil, 0.95 spec. grav.	2.831	2.831
Gasoline, crude	3.270	3.248
Gasoline, refined	1.635	1.624
Kerosene, crude	2.774	2.924
Kerosene, refined	1.357	1.462
Lubricants	2.50	2.50

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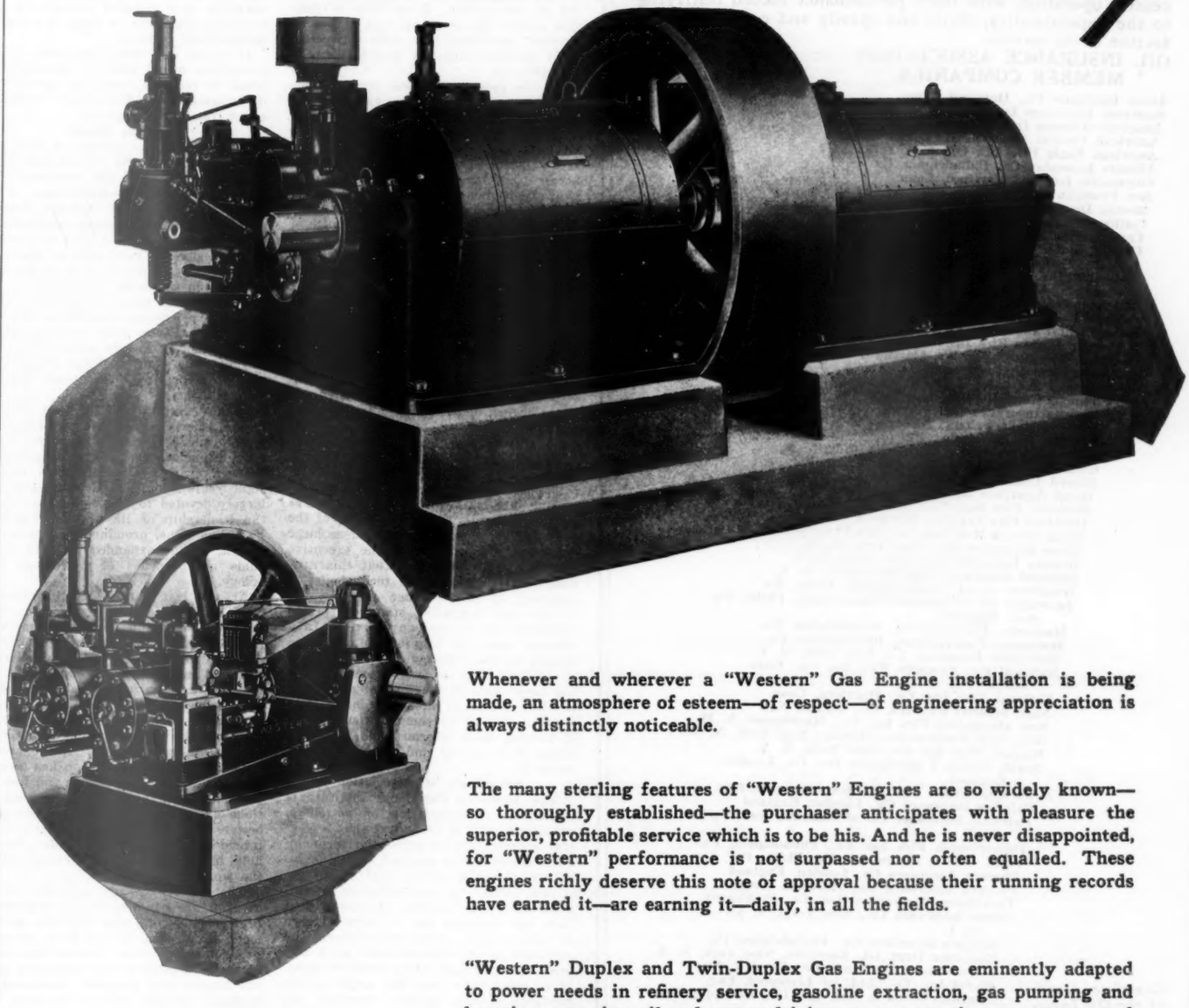

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TO UNITE PETROLEUM TECHNOLOGISTS AND SCIENTISTS IN ONE SOCIETY

By L. M. Fanning

The enlargement of scope of the Petroleum Division of the American Institute of Mining and Metallurgical Engineers to embrace all branches of petroleum technology suggests the possibility all oil technologists and scientists uniting in one society. From time to time this matter has come up, and it is particularly pertinent now with the petroleum industry definitely launched into a scientific era.

All the present technical organizations embracing petroleum do so as a division of their activities, with the exception of the American Association of Petroleum Geologists. It is only in comparatively recent years that petroleum technology began to assume importance in these organizations, but now petroleum divisions are strong and active parts of their activities, and the increasing importance of this branch is generally recognized.

The principal argument advanced for a central organization—an American Institute of Petroleum Technology—is that the oil business is made up of several main branches, all closely related, and that the interrelation applies to scientific oil problems, making it advantageous to have them discussed jointly and collectively. Such an organization would afford an opportunity for technologists in every branch of petroleum activity to get together in central and regional meetings, whereas at the present time the gatherings are of specialists in a particular branch of petroleum science.

The petroleum technologist is just coming into his own, but it is recognized that his progress and the progress of the scientific movement depends in a large degree on the attitude of the executive branch of the industry. That this attitude is favorable to the technologist is apparent if in no other way by the large and increasing staffs of trained technical men in company service. In a broader way, the help of the executive branch of the industry and the support of the petroleum investor extends to aiding these men in the mutual discussion of their problems, in so far as it does not run counter to company policy, and in keeping them informed and in stimulating their interest and activity in pure research.

Advantages of Association

The American Petroleum Institute is essentially an association of petroleum executives, and it is logical that a central organization of petroleum technologists should derive support from the institute, if not become a part of the institute, which is representative of all branches of the industry. At the present time the institute has a large number of technical men among its members. The emphasis in its departmental work has been more and more along technical lines. It is noteworthy that the early annual meetings of the institute stressed the general sessions while recent meetings have been characterized by the importance attached to group sessions devoted largely to technical discussions.

Another factor pointing to the advantages of an alliance between the American Petroleum Institute and the technologists of the industry is the recently established scientific research fund in the hands of the institute. It is apparent that were there a central organization of petroleum technologists at this time it would play a prominent part in the working out of a research program, and possibly in the actual work on research problems. As it is, it is probable that present organizations equipped for or interested in actual research work will receive some support from the institute fund and they will probably aid in an advisory way in shaping the policy of the research committee.

The institute's research fund now totals $500,000, providing for an annual expenditure of $50,000 over a period of five years. This fund, it is expected, will grow to considerable proportions as the movement develops, provided the direction of the work meets with approval and that its identity as a strictly petroleum research fund, donated by individuals and corporations identified with the industry, is preserved. With these provisos in mind, it is possible that the initiation of a research program will crystalize sentiment in favor of a central technological institute.

It would also seem that such an organization would tend to stimulate interest in research work and greatly aid in bringing about the growth of the research fund and program.

Nucleus Ready

Just how a consolidation of petroleum technologists could be effected and at the same time preserve the advantages enjoyed in segregated organizations is not clear. Excellent work is being done by all of the present technical organizations. It would be possible for them to continue in their present field, and at the same time for the technical men of all branches of the industry to get together in a central exclusively petroleum institute. Possibly the petroleum divisions of the several organizations could join the central organization in a body and function under direction of the central organization with the present institutions deriving support from the affiliation.

In any event, the Petroleum Division of the American Institute of Mining and Metallurgical Engineers appears to afford a nucleus for the development of the idea of a central organization. Formed eight years ago, its activities have been largely devoted to oil production. Under the leadership of its present chairman, F. Julius Fohs, prominent petroleum geologist, it has expanded its field to include all branches of petroleum technology.

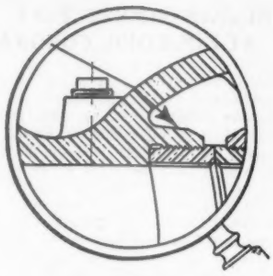
At the last annual meeting held in New York in February symposiums were read on production, production methods, refining, transportation and economics, attracting technologists in all these branches of petroleum endeavor. Sections were organized to embrace each of these subjects, each under the leadership of a vice chairman, and it is further planned to extend regional activities to include all the branches. At the present time the Petroleum Division has sections at Tulsa, New York, Casper and Los Angeles, and it plans to establish other sections at important oil centers so as to better reach operators, managers, superintendents and foremen. The sections hold bi-monthly meetings except during the summer months.

The membership and activities of this division are confined to the engineering branch of science, and with the development of its plans it will have petroleum production engineers, refining and transportation engineers and economists under one banner and mutually discussing the problems of their different branches. The American Institute of Mining and Metallurgical Engineers, itself, is one of four major societies of America.

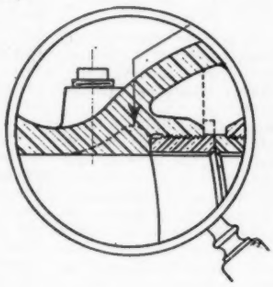
An important organization to be considered in connection with a possible central organization of technologists is the American Association of Petroleum Geologists. Organized in 1917, it struggled through a few years but for the past five years there has been an average annual increase of almost 200 members. At present its membership exceeds 1,300 and includes most of the petroleum geologists of this country and a few of other countries. Many members of the association are also members of the Petroleum Division of the A. I. M. E.

Research Program

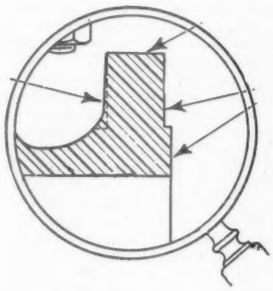
It is of interest in connection with this geologists' association and a possible relationship with the American Petroleum Institute that it has developed a research program. The association has not only pioneered in research but the members following lack of success in raising funds in the industry dug down in their own pockets for some of the work that was and is being undertaken. It is believed



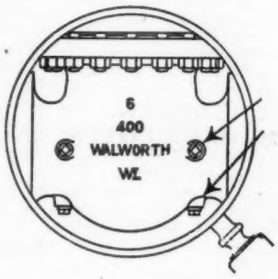
Point No. 7
Seat ring hubs project into spherical part of the body, insuring uniform temperature of rings and supporting metal.



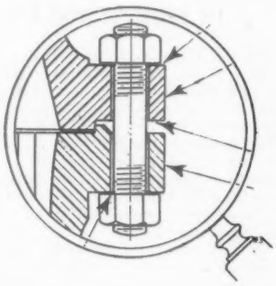
Point No. 8
The bore is perfectly straight. Recess back of seat ring in old style construction impeded flow of fluids through valve.



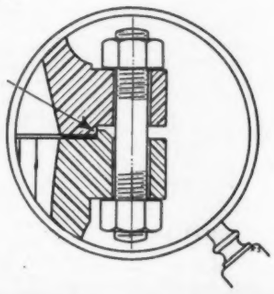
Point No. 9
The pipe end flanges are turned on the outside diameter. The bolt holes are spot-faced.



Point No. 10
Six tapped and plugged bosses are provided on the valve body for drains or by-pass connections.



Point No. 11
The bonnet flanges are turned on the outside diameter and back-faced.



Point No. 12
The bonnet joint is of the male and female type, and has corrugated monelmetalgasket.

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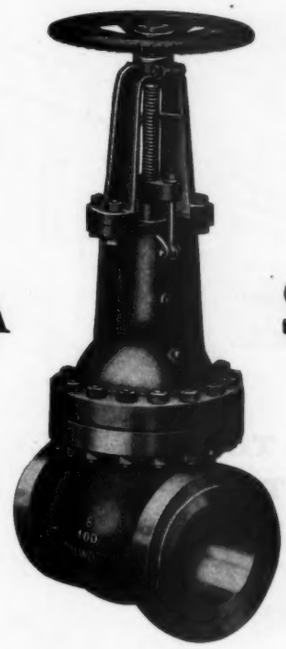

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These cross section enlargements show six more of the "30 Points of Merit" in the new line of Walworth Sigma Steel O. S. & Y. Wedge Gate Valves. Each point is designed to establish a new standard of Walworth engineering perfection. We shall be glad to send you a file of Walworth Sigma Steel Bulletins (Nos. 1-7). No. 3 describes and illustrates each of these 30 features in complete detail.

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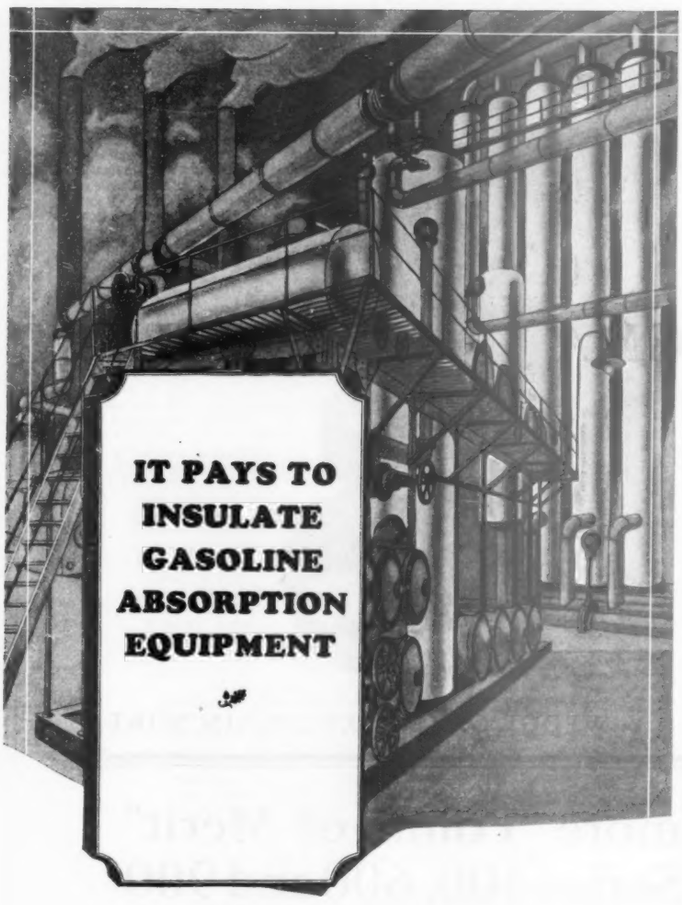

IN IMPROVED PERFORMANCE, in fuel savings (even where cheap natural fuel is burned) and in increased capacity the insulation of absorption equipment usually pays for itself during its first year of service.

STEEL SURFACES

Still shells, dephlegmator condensers, pre-heaters and boiler shells are ordinarily insulated with *Sil-O-Cel* Standard Brick, cemented on and steel-anchored for double assurance of absolute contact. The exterior is protected by an application of *Sil-O-Cel* hard-finish cement, which in turn is water-proofed with *Celcote*.

BRICK SETTINGS

The same Sil-O-Cel brick afford the most effective means of insulating still settings and boiler settings. Of standard fire brick dimensions, absolutely true to size and shape, they are easily incorporated in a fire brick wall.

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Our complete manual on the insulation of gasoline plant and refinery equipment will be mailed to superintendents and engineers. Address the office listed below which is nearest you.

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that the association has a strong claim for support of research work by the institute's research fund and that when a program is worked out it will receive a donation.

Petroleum chemists and chemical engineers are embraced in the membership of the Petroleum Division of the American Chemical Society, which also has seen a marked growth of interest and membership in the last few years. There are 200 members of the division, made up of men in universities, Government bureaus, industrial research organizations and petroleum companies. This division, as in the case of the Petroleum Division of the A. I. M. E., aims to represent all branches of petroleum interest in chemistry and its allies, physics and engineering, namely refinery, production, transportation and marketing.

Another division of technical activity to be considered in connection with a central organization is the recently organized Petroleum Division of the American Society of Mechanical Engineers. This functions on matters pertaining to the mechanical side of petroleum activities. The scope of the division work involves engineering phases incidental to production methods and equipment, transportation via pipe lines, tank cars and tankers, and to some extent the mining of fullers earth. In the refining of petroleum the division is interested in design of equipment used, combustion problems, the auxiliary equipment used in various refining processes, and so forth. It also goes into package handling and the manufacture of containers and into management engineering.

Present membership of technical societies or divisions interested in petroleum runs into several thousands. Membership is constantly increasing and a central organization could probably, with the active support of the executive branch of the industry, number well over 10,000.

ANDERSON ONE OF FEW POOR MAN'S FIELDS

(Continued from Page 102)

terest holders; one of them owning a one-fourteenth interest in seven-eighths of the production, which had cost him $35.71, reporting the earnings of his interest was $20 daily."

Few Big Companies

Few of the larger operating companies are in the Anderson County Field. The Prairie Oil & Gas Co. buys the bulk of the oil which is run through the Prairie pipe line but the company does not operate as a producer. The Sinclair Pipe Line Co. runs about 500 bbls. a day out of the field, but the Sinclair Oil & Gas Co. is not among the operators. The largest oil company operating is the Tidal and next to it the Southwestern Petroleum Co. Most of the producers are firms and individuals. It is a "poor man's field" and one of the few places left west of the Mississippi River where the small operator can get a "play" with any assurance of considerable return.

The field is at its best now and will be quite active throughout the year. The shoestrings extend in thin and irregular lines from Township 19-21, down through 20-20, 21-19, 22-19, 23-19 and 23-18, or from north of Greeley to southwest of Garnett taking in the towns of Colony and Welda on the way.

CANADIAN OBITUARIES

CHATHAM, Ont., May 1.—John Roberts, associated with the first Bothwell oil boom some 60 years ago, died recently at his home in Zone Township, Kent County, in his eighty-eighth year. The spectacular Bothwell boom of 1866 was ushered in by the drilling of the once famous Lick flowing well.

S. Elmer Kerby, formerly one of the best known of the Petrolia foreign drillers, died suddenly at Toronto, a few days ago, in his 36th year. Mr. Kerby in 1909 made his first trip as a foreign driller to the Egyptian fields. Later he drilled in British New Guinea. Returning from foreign fields in 1917, he contracted malaria fevel and spent nearly a year in hospital at Brisbane, Australia.

SINCLAIR STARTS TEST AT BOULDER, COLORADO

DENVER, Colo., May. 1.—Sinclair Consolidated Oil Corp. began its first Colorado wildcat test on the Parallel structure, 1¼ miles east of Boulder, in the NE cor. NE NW, Section 33-1n-70. The well is on the David R. Denies 80-acre farm; and this lease, the well and the drilling cost are shared equally by Repollo Oil Co., development Subsidiary of Sinclair Consolidated Oil and MacKinnie Oil & Drilling Co., of which former Gov. Oliver H. Shoup is president. The two companies hold this 80-acre tract half and half in an undivided interest, but the remaining area of the structure comprising 5,200 acres, is held equally by the two companies separately in checkerboard tracts.

Equipment will be installed capable of drilling to more than 5,000 feet, with an 84-foot standard derrick. The contract has been let to the Chanute Dilling Co., a Sinclair subsidiary. The objectives are the Hygiene sand, expected at 3,200 to 3,500 feet, and the Muddy and Dakota sands, expected at 4,600 to 5,000 feet. The Boulder gas horizon will be reached at 1,800 feet and the Boulder shale oil horizon at 2,530 feet.

The Parallel structure is on the same geological fold as the Haystack structure, to the north, which was unsuccessfully tested with deep drilling by Midwest Refining and Ohio Oil. The two structures are divided by a faulting known as the Valmost dike. The Parallel structure was discovered by State Geologist R. D. George 10 years ago. In 1924 Paul B. Whitney, now in New Zealand but at that time geologist for Sinclair, worked out the structure in detail, many of the dips being proved by extensive pit digging.

The field operation will be directed by Field Superintendent Fred Dougherty in Boulder. The equipment being erected was used to drill to 4,800 feet in the Rex Lake Field near Laramie, and the walking beam is said to be the largest in Colorado. The well will be spudded in with 20-inch casing and the first landing will be with 15½-inch.

RATES UNREASONABLE IN SHREVEPORT CASE

WASHINGTON, D. C., May 1.—Examiner Morris H. Konigsberg has submitted a proposed report to the Interstate Commerce Commission in the case of the Louisiana Oil Refining Corp. vs. St. Louis, Southwestern Railway Co., holding that rates charged on crude oil in tank carloads between July 5 and September 1, 1923, from Verla, Ark., to Shreveport, La., have been unreasonable and reparation is awarded.

The examiner recommends that the commission should find that the rate of 12.5 cents per 100 pounds charged on the shipments which moved on and after September 1, 1923, was not unjust or unreasonable; but that the charges collected based on the rate of 15.5 cents per 100 pounds on the shipments which moved prior to September 1, 1923, were unjust and unreasonable to the extent that they exceeded charges based upon the subsequently established rate of 12.5 cents. In this case charges were collected on the shipments which moved prior to September 1, 1923, at the applicable rate of 15.5 cents and after that date at the applicable rate of 12.5. The complainant contended the rates charged should not have exceeded 9 cents, which rate complainant requested defendant to publish prior to the movement of the shipments.

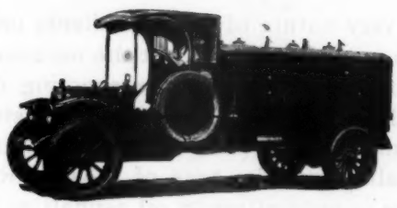
STORAGE-IN-TRANSIT

The storage-in-transit privilege on tubular goods, which has long been sought by various Mid-Continent oil concerns using large quantities of casing, tubing, etc., has again been taken up by the Interstate Commerce Commission and some kind of a decision in the case is hoped for soon.

Time ~ The Test Of The

Vogt *Auto Truck* Tank

There is no substitute for time, nor is there a better test of real service.



Here are pictured a few of the "Early Birds" still in service every day although they have already established an enviable record of many years hard usage.

Today the Henry Vogt Machine Company still builds these quality tanks, including the very latest safety devices as shown below. Their numerous advantages are explained in detail in a new descriptive folder which will be sent upon request.

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ACTIVITY IN PIPE IS UNABATED WITH SOME DEFERRED DELIVERIES

By B. E. V. Luty

PITTSBURGH, Pa., May 3.—The steel market in general has grown a trifle less active still in the past week, and is now relatively dull, but this is only by comparison with the altogether unusual activity of the past six months. The volume of business is probably equal to the average, not having dipped below, as it has done so often in the reactions of the past. Pipe is perhaps the only line which has shown no decrease in activity in the past few weeks.

The decrease in steel buying began in the latter part of March but was of small moment until the past two or three weeks, when there has been a very decided slowing down in nearly all lines. While the mills did not have much forward business on books, current business does take some time to execute, and operations have not by any means dropped to the level that would be made by the continuance of buying at the present lower rate. Up to date there has been only a slight decrease and the rate is still a very high one. The month of March, in ingot production, ran 5 per cent over February and 6 per cent over the average of the four months through February. This excess has come off, and a little bit more. March production was at 92 per cent of estimated capacity, and production now is in the neighborhood of 85 per cent. It may be only a week or two until an 80 per cent rate is reached and by July 1 the rate is likely to be somewhere between 60 and 70 per cent.

No Stock Accumulated

All previous bulges in steel production have been accompanied by stocks accumulating in buyers' hands, and then when buyers turned in to liquidate stocks there would be a double decrease in production, which would go as far below the rate of consumption as it had previously been above it. This time there has been no accumulation of any consequence, which with the very high production shows that consumption has been very high, and no great decrease can occur without a large decrease in consumption.

But little decrease in the rate of actual consumption seems to have occurred. The steel consuming industries in general appear to be operating approximately as well as in the past few months. The automobile industry has been slowing down, but it was only recently that it picked up, and the present decrease is seasonal.

The very backward spring has had an influence in deferring the ultimate consumption of steel, particularly in the movement of manufacturers of steel and in the movement of steel from jobbers. This influence is mentioned particularly in the case of sheets, wire products and merchant pipe.

Fabricated structural steel lettings have run somewhat light in the past three or four weeks, but there had been a fair run of business in January and February, with a good run in March, and the fabricating shops seem to be doing substantially as well this year as last year.

There has been no freight car buying of much consequence for seven weeks, but there is a fair amount of car building still to be done, against old orders.

Jobbers are buying merchant pipe more freely in the past fortnight, particularly jobbers in the East. The flow of orders is still somewhat below what would be expected at this time of year, given active building and industrial conditions.

Oil Country Goods

Oil country goods are being bought very freely, with a slight further increase in the past fortnight. On some sizes deliveries are now deferred slightly, mills making promises of shipment in two or three weeks on some sizes.

Pipe mill operations are at 85 to 90 per cent, with practically full operation of lap weld furnaces and moderately full operation in butt weld departments.

Sheet prices had shown quite a weakening at the time of last report, and are a shade easier still now. Otherwise there is no change as to steel prices.

Pig iron, coke and scrap continue very dull.

METHOD OF TESTING GAS APPLIANCES

(Continued from Page 66)

of the burner. Either of these conditions is usually dangerous and represents the ratio of primary air to gas above which the appliance cannot be satisfactorily operated.

As the amount of primary air is decreased, a condition is reached where the flame begins to show yellow. In most appliances this is to be avoided because carbon is deposited on the metal or material surrounding the flame; and, although the yellow flame is not necessarily a sign of carbon monoxide production, its use is not good practice because it lowers the heating efficiency. (There are some appliances designed to burn with a yellow flame, but in these the flame does not impinge on any solid surface, and as it burns freely in the surrounding air the above objection does not apply.)

The third class of conditions which result in the liberation of carbon monoxide includes the use of appliances in which the flame is stable and which do not deposit carbon, but in which combustion is nevertheless incomplete. The following brief discussion indicates the principal factors which produce such conditions.

The burning of gas is a chemical reaction between the gas and the oxygen of the air, which will take place only at high temperatures. When the flame has an unrestricted supply of air and it does not come in contact with surrounding objects, combustion is complete. This is true whether or not air is mixed with the gas before it issues from the burner ports. If, however, the access of air to the flame is so restricted that the qantity of oxygen which mixes with the gas stream before it is cooled below the reacting temperature is insufficient to combine with all of the gas, combustion is incomplete and carbon monoxide is produced.

The supply of secondary air to most appliances is exactly like the draft in a chimney and results from the same cause, which is the upward displacement of the heated gases by the surrounding air, which is cold and therefore relatively heavy. When considering secondary air three causes of failure to meet the requirements for complete combustion may be distinguished: (1) The draft through an appliance is not great enough to supply the amount of oxygen chemically required for complete combustion. (2) The total amount of secondary air circulating through the appliance may be adequate, but its distribution and direction of flow and the arrangement of burner ports are such that some of the flames do not receive their share. (3) The secondary air may be adequate and well distributed, but the combustion space is too small to permit complete combustion before the gases are cooled below the reacting temperature. In most appliances an excessive supply of secondary air unfavorably affects the thermal efficiency, hence appliances should be, and usually are, designed to take as small a quantity of secondary air as possible without affecting the completeness of combustion. When the effort to secure this efficiency is carried too far and the supply of secondary air, or the space allowed for combustion, is too limited for the quantity of gas burned, one or more of these three dangerous conditions is encountered.

The greater the proportion of the air needed for complete combustion that is injected as primary air the smaller the quantity of secondary air required, with a consequent minimizing of the chances of smothering the flame. Primary air is much more effective than secondary in assuring complete combustion because it

A Valve for All Oil and Gas Well, Field and Refinery Service

Fig. 102 — Bronze Renewable Seat Globe Valve. 200 and 300 pounds W. S. P.
Sizes ⅛ to 3-inch.

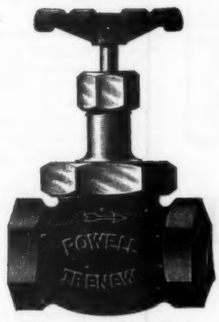

Fig. 190——Iron Body Bronze Mounted Renewable Seat Globe Valve. 150 pounds W. S. P.
Sizes ¼ to 3-inch.

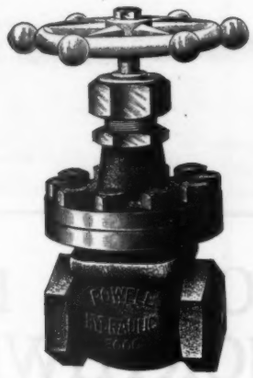

Fig. 178 — Bronze Hydraulic Gate Valve, solid wedge disc, non-rising stem. 2000 pounds W. S. P.
Sizes ½ to 3-inch.

Fig. 375—Bronze Rising Stem Gate Valve. 200 and 300 pounds W. S. P.
Sizes ¼ to 3-inch

Fig. 460—Iron Body Bronze Mounted Rising Stem Gate Valve. 125 pounds W. S. P.
Sizes ¼ to 3-inch

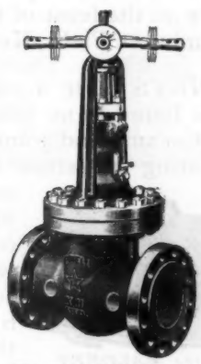

Fig. 3416—Steel Gate Valve, monel working parts. 400 lbs. W. S. P., 750° F.; 250 lbs. W. S. P., 900° F.
Sizes 2 to 16-inch

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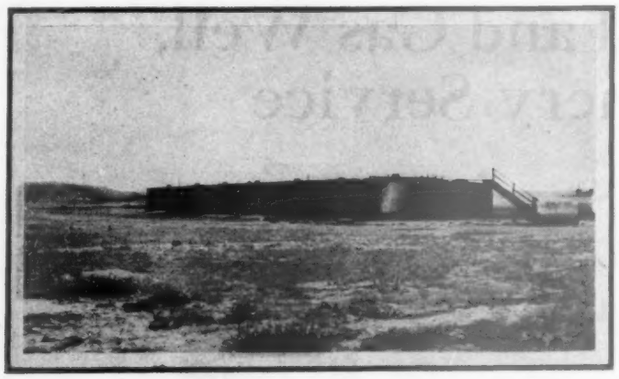

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MALONEYS offer a combination of advantages found in no other tank:—Patented offset seams and joints, construction of rust-resisting Keystone Copper Steel, all seams strongly reinforced, cleaning out plates flush with bottoms, the best valve and thief-hatch equipment the market affords.

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MADE OF KEYSTONE COPPER STEEL

MALONEY PATENTED BOLTED COPPER-STEEL TANKS

MADE OF KEYSTONE COPPER STEEL

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is mixed with the gas from the start and has an opportunity to react during the whole time from ignition to final cooling below the reacting temperature, and also, in some cases, because it reduces the volume of the flame. Provision for primary air is therefore one of the most important characteristics of any particular design.

Type of Tests Needed

In order for methods of test to accomplish the desired results they must fulfill several requirements. First, they must be easy of application to all types of gas appliances. Second, the results should be of such a nature as to permit as accurate determination of the conditions under which the appliance will fail to give satisfactory service on any one gas supply. Third, from the results obtained with one gas supply or a reasonable number of gases it should be possible to judge the operation of a particular appliance under all other gas service conditions. Fourth, the complete testing of an appliance should be fairly rapid. Fifth, in order for the tests to be productive of the greatest good, an interpretation of the cause or causes of failure should be possible, thus enabling the manufacturer of a poor appliance to correct his design and make the appliance satisfactory for the service it is intended to render.

The tests described in this paper have been developed to meet the requirements outlined, but they cover only a portion of the necessary field. This paper deals only with tests which show under what conditions combustion is satisfactory from the standpoint of safety and does not include any consideration of efficiency or other requirements for a good appliance. The paper is also limited to tests with a single gas; the necessary study of the effect of changing the composition of the gas supply upon the performance of the appliance awaits facilities which are now being provided.

KENTUCKY-TENNESSEE

(Continued from Page 56)

the interest of Shreveport capital relative to laying a pipe line, and they will also start a drilling campaign. B. F. Holdbrook & Son of Lexington, have been looking over the field in the interest of Lexington capital. W. A. Hass of Lottie, La., has had a location made on the Baler & Elliott farm, and the rig is expected on the location within a very few days.

The well being drilled by Wood-Haislet for Sam K. Baird encountered a heavy flow of gas in the Upper Sunnybrook sand and is being drilled to the Lower Sunnybrook. This well is located some 2,500 feet north of the Grider farm. Wood-Haislet, McLennon & Calhoun will start a drilling up on the G. W. Brockman lease. Baird & Hickman are moving in five new welded tanks to the Morgan and Grider farms. Wood-Haislet are moving a car load of material to the Brockman lease. Columbia, the nearby town, is taking on the aspect of a real oil town with new arrivals at all hours, and no section of Kentucky in recent years will see more action than the New Hopewell section.

In the West Fork district, the Alta Oil Co. is shut down at No. 2 Cheatham, waiting for a string of 4½-inch casing.

In the Kettle Creek district, Two Creeks Oil Co. is spudding No. 1 on the W. T. Blyth lease. George Smith and others are drilling No. 1 Carly Scott tract. Mr. Mitchell is drilling No. 1 below 100 feet on the Roley Kerr lease on Lower Kettle Creek. McClintock and others are drilling No. 1 Dave King lease. Young Oil Co.'s No. 1 J. Pondexter lease, fishing at 400 feet.

In the Sulphur Creek district, W. S. Raydure & Son set 560 feet of 6¼-inch casing, having struck the cave at 556 feet, and drilling below 600 feet, at No. 5 M. E. Coop lease. Hook and McComas set 185 feet of 6¼-inch casing in No. 2 J. B. Riddle lease and drilling around 500 feet.

On Williams Prong, Wilcox Brothers are drilling No. 2 on the Davis farm. Doctor Lang is drilling No. 1 on the Owens farm. West & Thrasher are due to complete No. 1 on the W. M. Davidson farm.

Other Developments

In the Scottsville Field of Allen County the Citizens Oil Co.'s No. 14 on the I. H. Rickman farm, pumped 7 bbls. at 336 feet with No. 15 drilling. Fred W. Owens' Nos. 8 and 9 on the A. A. Davenport farm, are reported good for 3 bbls. each, at 380 feet. Huffman and others' No. 10 Dovie Mantlo, Lee Moore's No. 5 Moore and R. A. Stohr's No. 8 J. T. Johnson, are all nearing the pay depths.

In the Bowling Green Field of Warren County, Dr. W. B. Cauble and others' No. 4 J. T. Vance, was dry at 460 feet. Several wells in the county are nearing the depth to find oil. Onsel-Hanrahan Oil Co.'s No. 5 C. G. Davenport, is a 5-bbl. producer at 540 feet.

Barren County

Only three completions were reported from the Glasgow Field of Barren County during the week, due to wet weather. In the Lecta Pool, east of Glasgow, the Esslinger Oil Co. drilled in No. 4 on the C. B. Jones but found a heavy dose of salt water in the pay sand and abandoned the well. It was on this farm that the discovery well of the pool was found. This company is drilling No. 1 McCoy farm, same pool.

In the Emery-Moore Pool, the Houchins Leasehold Co.'s No. 12 on the Ziegler, has been drilled in and shot, showing for 5 bbls., with No. 13 drilling.

In the Gorby Pool, Lew J. Emery & Sons Co.'s No. 26 on the Depp-Greer, had only a slight showing and was plugged while No. 27 is nearing pay depth.

Along the Tompkinsville Pike, southeast of Glasgow, the Wentworth Oil Co.'s No. 1 on an unknown tract adjoining the Matthews farm, is showing for a 2-bbl. pumper.

The Hiland Oil Co. is drilling No. 16 on the Casaday, in the Gorby Pool. Several wells are due for completion in this county which is the most active in the State.

Eastern Division

Up to the present the wildcat being drilled by the Standard Oil Co. of Kentucky, 10 miles southwest of London, in Laurel County, has failed to find any profitable signs of oil and is still drilling. Favorable geological reports have been made in Knox County, on the Indian Creek structure and several of the larger operating concerns have secured acreage with a view of testing out the area. It is claimed to be an ideal structure but it will have to be tested by the drill to get results. Work throughout the eastern division is centered in the Big Sandy area in the extreme eastern part of the State. The bulk of the work is in Lawrence, Johnson, Magoffin and Floyd Counties at this time and all four counties are in for a heavy play.

Nine completions were made in the eastern division with the North Weir Field of Lawrence-Johnson Counties leading. In this area the Swiss Oil Corp. brought in four wells. No. 34 on the P. P. Holbrook, in District 32, pumped 10 bbls.; No. 17 J. M. Fyffe, District 33, pumped 5 bbls.; No. 7 R. N. Sparks, District 22, pumped 4 bbls., and No. 10 Caney Sparks, same district, pumped 5 bbls.

In the South Weir Field of Johnson-Magoffin Counties, the Short Fork Oil Co.'s No. 3 J. M. Frazier, pumped 5 bbls. and in District 31 while C. A. Kirk's No. 2 S. W. Phipps, District 29, pumped but 1 bbl.

In the Irvine Field of Estill County the Reno Oil Co.'s No. 8 S. M. Maple, District 8, pumped 8 bbls. from the Irvine sand and in District 7, Marcum & Howell's No. 2 C. B. Howell, pumped 2 bbls.

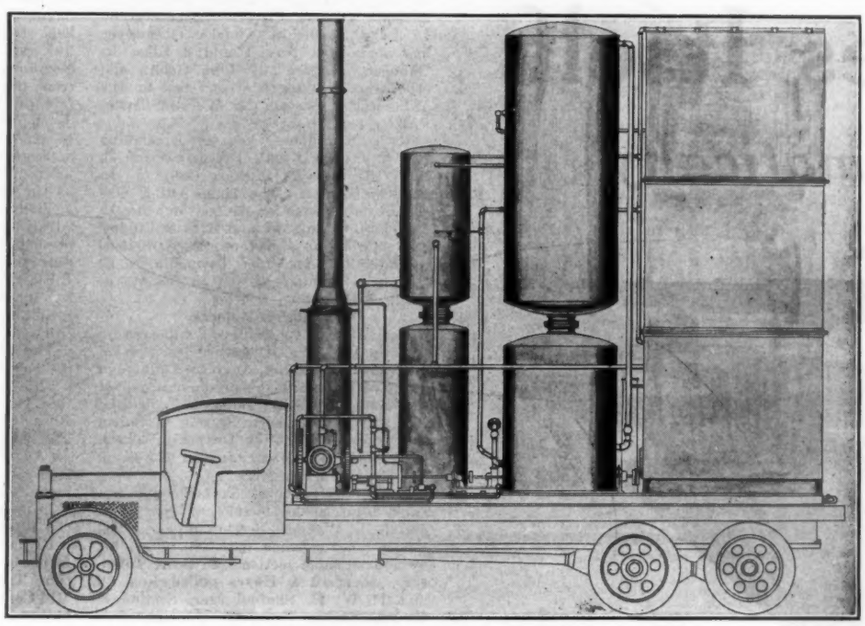
In District 3 of Wayne County, D. C. Adkins drilled a dry hole in No. 4 on the Burnett heirs' farm.

CENTRAL WEST

(Continued from Page 56)

Nos. 2, 3, 10, 11, 12, 13 and 14 M. Aurand, Section 24.

In Middleton Township, Wood County, Otto A. Brown is drilling No. 7 on the



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O&GJ 5-6-26

Frank Rogers, Section 28 east, and Charles A. Tanner is drilling No. 3 on his own farm, Section 21. In Perrysburg Township, the Oko Oil & Gas Co. is drilling No. 5 George Deverna, Section 29, and No. 3 Louise Deverna, same section. In Lake Township, Charles Obermeyer has abandoned Nos. 1 and 2 Eliza R. Bahnsen, Section 23. John Geldin and others are starting a second test on the Mike Roller, Section 22, Webster Township.

R. T. Rittenhouse has started drilling No. 3 on the Frank Freed, Section 6, Eagle Township, Hancock County. In Biglick Township, the Ridge Oil & Gas Syndicate is starting a test on the L. Wonders, Section 35, and Kirk & Fitcher are at work at a test on the S. Seiber, same section. In Union Township, N. E. Bryson is drilling No. 16 on the W. S. King, Section 26.

Auglaize Wildcat

Cook & Crow are drilling a wildcat venture on the John Kintner heirs, Section 4, Pusheta Township, Auglaize County, in hopes of extending the producing area of the county. The Bachelor Oil is drilling No. 9 W. T. Seibert, Section 7, Salem Township. In Moulton Township, Wheeling & Zimmerman are drilling No. 1 on the Charles Fritz farm.

In Sandusky County, in Jackson Township, John Spohn abandoned Nos. 1, 2 and 3 J. Wagner, Section 6, and Fred Peach did the same with No. 1 on his own farm, same section. In Scott Township, Sherman & Hayes pulled Nos. 10 and 11 W. H. Shatenberger, Section 8. In Washington Township, the same parties have started drilling No. 1 on the Amos Waggoner, Section 11, and the Ohio Oil Co. is starting No. 13 J. H. Bergman, Section 30.

Mack P. Colt and associates' No. 1 well, 300 feet from the north line and 900 feet from the east line of the Mosan Townsend farm, Section 9, Center Township, Mercer County, is reported at 15 bbls. flush. Sand found at 1,145 feet and drilled 45 feet in the sand. In Union Township, same county, the same parties abandoned Nos. 1, 2, 3 and 4 on the J. M. Yocum; Nos. 1, 2, 3 and 4 Jacob Yocum fee, and Nos. 2 and 3 J. R. Wooden farm, all in Section 10. The material will be utilized for further operations in the same field where Mr. Colt controls quite an extensive body of leases, some developed, others being virgin territory.

Margaret E. Grace and others' No. 4 well, 900 feet from the north line and 500 feet from the east line of the G. W. Crone farm, in the NW of Section 21, York Township, Van Wert County, pumped 4 bbls. Top of sand at 1,204 feet and total depth 1,241 feet.

J. H. Murphy & Son are drilling their No. 6 on the Leister & Tilliston farm, Section 29, Liberty Township, Seneca County, in the Tiffin Field, and Arthur E. Geyer is drilling a well on his own property, Section 29, Clinton Township, same county.

In the Elmore Field of Harris Township, Ottawa County, the Zorn-Hornung Co.'s No. 13 well, 125 feet from the south line and 600 feet from the west line of the Edward W. Yeasting farm, Section 18, pumped 15 bbls. at a total depth of 1,340 feet or 50 feet in the sand. The Burman Oil Co. is starting a test on the H. W. Neiwman farm, Section 23. The Oak Harbor Natural Gas Co. has been delayed with a fishing job at a test on the A. G. Mylander farm, Section 5, Salem Township.

In McLean Township, Shelby County, L. T. McGrath is drilling No. 1 and putting in a rig for No. 2 on the Henry Ernst farm, Section 9. In Cynthian Township, W. E. McKelvey and others' No. 5, located 1,550 feet from the south line and 775 feet from the east line of the Henry Wissman, Section 27, is only good for 1 bbl. The Ohio Oil Co. is starting a second well on the Theresa Guffena, Section 35. Slagel & Johnson are drilling No. 1 J. Eilerman, Section 16. Wittmer Property Trustee is drilling No. 1 J. Sherman, Section 16, and Lee A. Watson is drilling No. 5 J. H. Barhorst, Section 34.

Michigan

Too much rain has kept development work down in the New Saginaw Field of Saginaw County, Michigan, but warm weather will bring additional development. The well of the Saginaw Prospecting Co., on the A. Kuinitzer farm, Section 14, Saginaw Township, is estimated at 20 bbls. This company is drilling its No. 1, its sixth venture in the field on the Northmoor subdivision, about 300 feet from the discovery well and will be the farthest well to the south in the new development. It is also the first test to be made in the northern part of the city of Saginaw.

The Bliss Petroleum Co. has its test on the Carl Boldebuck 160 acres, Section 2, drilling, which is more than a mile in advance to the north of the most northerly producing well in the field which is the Sun Oil Co.'s Weiss farm well. The Bliss Company is also building a rig for its No. 2 on the Casper W. Ulrich farm, Section 14, and a location away from its No. 1.

The Saginaw Prospecting Co. has made its location for No. 7 well which will be No. 1 on the John Palvas farm, Section 14, and an offset to the west of the Bliss Petroleum Co.'s No. 1 Ulrich farm. The Sun Oil Co. is starting No. 1 on the Adam Nuerminger farm, directly north from its producing well on the Weiss farm, and also starting No. 1 on the John Scoenheit farm, directly south from the Weiss farm well.

Clyde C. VanVleck of Toledo, Ohio, and formerly of Buffalo, N. Y., but an old-time Trenton Rock operator as well as Mid-Continent operator and one of the builders of the Paragon Refining Co. of Toledo, which was first known as Stowe, VanVleck & VanVleck, paid the Saginaw Field a visit and appears to be well pleased with the outlook. He may do some test work to the northeast of Saginaw, on the east side of Saginaw Bay.

Indiana

In southwestern Indiana, in the Princeton district of Logan Township, Pike County, Miller & Davis' test in the southwest corner of the J. Wilson farm, in the NW of Section 13, pumped 23 bbls. Top of sand at 1,380 feet and drilled 38 feet in, with a flush of 23 bbls. This is slightly in advance of production. J. Morsey and others are drilling a test on the William Miley farm, Section 14, and C. Chandler and others are drilling a test on the Miley-Chandler farm, same section. The Consolidated Oil Co. and others abandoned No. 1 on the C. Atkinson, Section 22. In Monroe Township, same county, the Ohio Oil Co. is drilling a test on the Parker-Wilson farm, Section 16.

Three new wells are starting in Gibson County. The Gem Oil Corp. is drilling a second test on the T. J. Parker, Section 17, Barton Township. In White River Township, Bell Brothers are at work at a test on the Lulu P. Harvey, Section 15, while the Ohio Oil Co. is drilling No. 4 W. A. Roberts, Section 7, Washington Township.

The Murphy Oil Co. is drilling No. 4 on the W. E. Harrison, Section 19, Harrison Township, Knox County.

Trenton Rock Area

The old Trenton Rock Field of eastern-central Indiana is very quiet but considerable new work is being planned. In Delaware Township, Delaware County, the J. E. Houck Oil Co. and Hawkins' No. 11 J. W. Goings, Section 9, was dry.

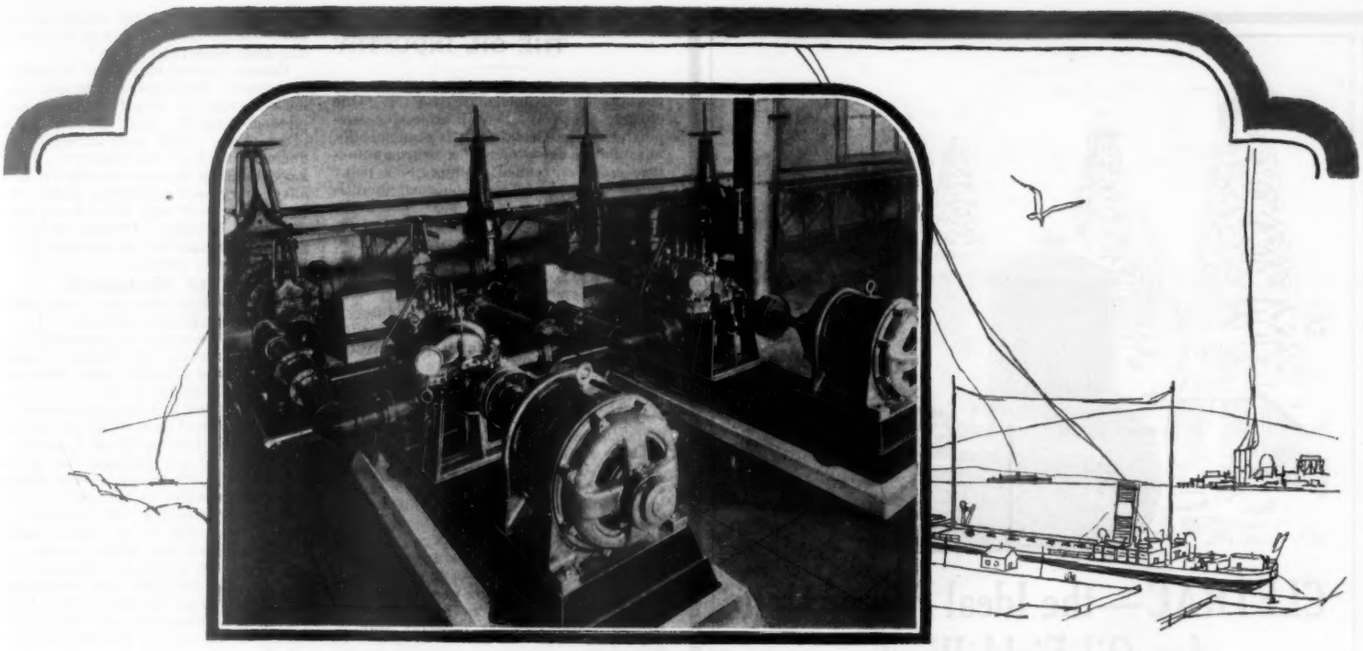
J. H. Harmon, well-known oil operator of Mansfield, Ohio, has purchased three old wells on the Mary J. Niblick farm, Section 5, Jefferson Township, Adams County, and is now drilling No. 4. In Blue Creek Township, same county, Schuet and others' No. 2 G. Runyon, Section 16, pumped 3 bbls. In Monroe Township, R. S. Anderson and others of Minneapolis, are drilling a test on the Crist Stengle 90 acres.

In Penn Township, Jay County, the Amber Oil Producing Co. is drilling No. 11 S. E. Davis, Section 21. In Bear Creek Township, C. S. Haviland abandoned No. 1 on his own farm, Section 30.

Illinois

Wildcatting does not bring forth very much of interest at this time in any part of Illinois, but there is plenty of pros-

(Continued on Page 142)



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INTERDEPENDENCE OF THE OIL INDUSTRY

(Continued from Page 84)

can predict an immediate use for. One danger, therefore, lies in excessive surplus products. Certainly it is economically unsound to overproduce or overmanufacture crude or refined products to a point where unnecessary and abnormal quantities, particularly of refined petroleum products, are stored. The carrying of excessive or abnormal stocks is a speculative risk. The greater the excess, the gerater the risk.

It is merely stating elementary economics to say that when any industry's storage facilities become chocked with surplus products available for markets where there are no customers freely buying there is an urge for the market, momentarily, to part company with intrinsic values. Under the stress and strain of disposing of that surplus, competition usually runs amuck. It availeth little in a crisis like that for men to berate each other. The cockpits of trade, under such conditions, are always filled with conflicting interests.

The only economic law which can be cited as an effective preventive for situations like that described is the one which says "make products for use rather than merely making products for sale." By this is meant to make products only in quantities which can be absorbed by the public. This is nothing new. You have heard it many times before. I cite it here merely to preface the suggestions that unless the well known economic rule of action prevails in the oil industry of the future there are those who may live to see anxious days ahead.

What the respective units of the oil business do about production and manufacture and distribution is and must always remain their own individual business. What you and I think could or should be done is another story. Generalizing, I think the oil business ought to regularize its production, its refining and its distribution operations. I think the oil industry ought to be stabilized, but I do not believe it can be stabilized piece meal. I do not believe it possible to strangle, economically, one branch of an industry so interdependent as ours and expect the other branches to be fundamentally sound. I believe that the greatest success in the oil business of the future will come chiefly through improved processes, reduction of costs, the elimination of economic waste in distribution and through new uses. I believe that the oil man who wants to loom largest in the picture of any recasted industry will begin now to get his organization ready to compete along those lines.

I think that under any new oil dispensation the business organization that follows reckless and wasteful methods will be most unlikely to survice the competition of low cost producers and distributors. I believe that the creative methods of inventive and administrative minds are more of an economic necessity in the oil business today than ever before. The big problem of management in future must be how to make the product at the lowest possible cost with a minimum of waste and selling effort. I believe that much of the oil history of the next decade is going to be written by the standardization engineer, by the geologist, and in the scientific laboratories. I believe that in making war upon waste, not physical but economic, we shall be driven more and more from individualistic positions to cooperate methods.

Price Not Important

I sometimes think we do a lot of unnecessary worrying about the price of a product. I have never thought that the price, per se, for which we sold a given commodity was any particular criterion. It has always seemed to me that the thing we are most interested in is the difference between what we got for it and what it cost us because that is what spells profit or loss in our balance sheets. The most important word in the dictionary of business is not "Gross" but "Net". So, it seems to me that when competition seriously threatens to scale down "net" profit we must make the search for economies and for efficiencies and for new uses the great objective.

Coming events cast their shadows before them. Fundamental changes are almost certain to result from improved methods and the more general practice of cracking. This must affect the producing branch of the industry. It must have its affect on costs of refining. It may affect margins of marketing profit. In its final analysis it may affect every branch of the oil business. Perhaps it is giving you men engaged in the natural gasoline industry some concern.

New Developments

The atom has taken on a new meaning in modern business economy. In your business the chemist is a commanding and important factor. No industry requires more skill and scientific study than yours. My specific message to you, if I have one, can be summed into his suggestion. If I were an integral unit of the natural gasoline industry I do not think I would trust the future of my business to a mere knowledge of old things. Many problems like that involved in the question what, if any, relationship the current tank wagon price for U. S. Motor gasoline should have to your basic contract price per gallon, are giving you concern. They may be, and no doubt are, important to you and to your business. But I think the most fundamental one of all to the future of the natural gasoline industry is whether or not there are other and new uses to which natural gasoline, or one or more of its constituent elements, can be put. Sound manufacturing principles surely will support a suggestion that the natural gasoline product itself ought to be submitted to the most exhaustive and rigid scientific tests to see what it will do and why it does it, and to find, if possible, new uses and wider markets. Any degree of success in this direction could not fail to strengthen your economic position.

The key to your progress, and the interest of your stockholders, may be partly in the lap of the gods. In my judgment it is largely in the hands of you men who are engaged in the industry. Industrially speaking, your branch of the oil business is still in its swaddling clothes. Every sign points, unmistakably, to a permanent and stable industry. I could enumerate many reasons why I am a "bull" on natural gasoline. Not the least of my reasons in my faith that the men now engaged in the business for which they are already noted.

Finally, I would be willing to wager that as the natural gasoline industry expands and prospers, as it must, you will in future credit much of your industrial success to the solidarity which you are building in your own branch of the industry and to the contribution which you have and will make to the over-all solidarity of the entire petroleum industry. Men, like you, who have done their bit in the pioneering work of building this comparatively new industry, cannot fail to receive the reward for your labor, nor can you, with your vision, overlook nor forget Kipling's line—"It ain't the individual nor the army as a whole, but the everlasting team work of every blooming soul."

You are proud to be a part of the great petroleum industry. So am I!

DEPRECIATION AT GASOLINE PLANTS

(Continued from Page 82)

company had three plants in the same pool. They use the unit basis for computing depreciation, and accordingly estimated the gas reserves in each of the several leases connected to these plants. It became advisable to abandon plant No. 1. Some of the gas formerly going into this plant was turned into each of the other two plants, No. 2 and No. 3. Plant No. 1 investment was credited with depreciation already written off and with material salvaged at condition prices, which followed the items to their new locations and was charged with the cost of dismantling. The balance was divided between Plants No. 2 and No. 3 in the

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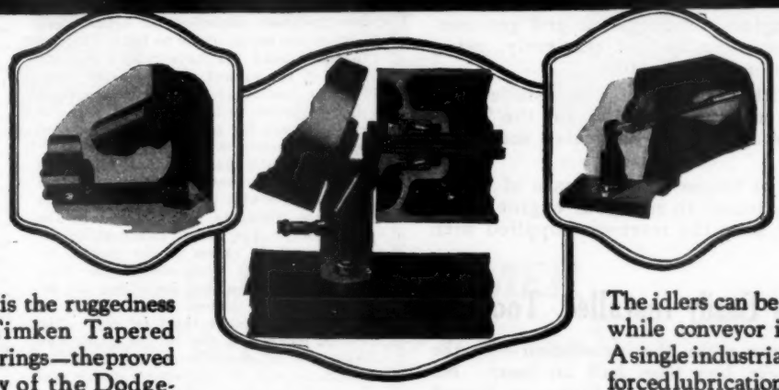

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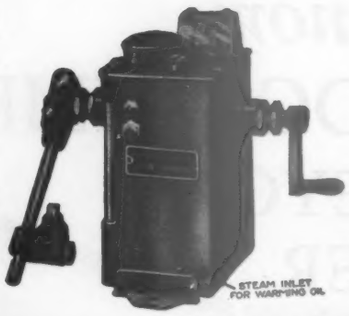

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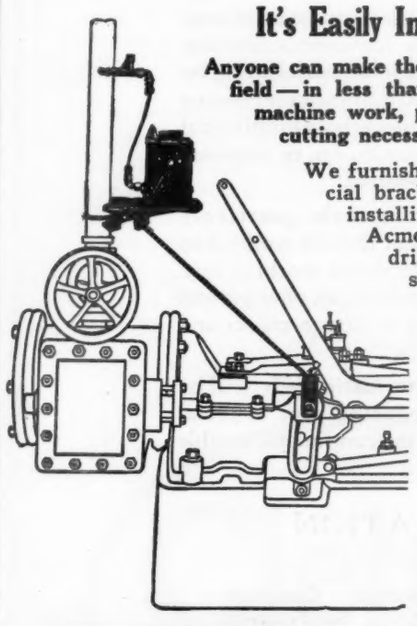

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same proportion as the estimates of gas formerly going to Plant No. 1 but now turned into each of the other plants. Thus if the estimate of gas reserves were 500,000,000 cubic feet and Plant No. 2 took over leases representing 300,000,000 cubic feet, Plant 3 taking the balance, the balance of Plant No. 1 investment after making the credits noted above was split, three-fifths of it being charged to Plant No. 2 and two-fifths to Plant No. 3. Thus, both the gas reserves and the investment at each of these plants were increased. It may be objected that this method unduly penalizes the surviving plants; but this appears to me to be rather shortsighted. The company did go into that field and did make certain investments in plants to get the gasoline out of the leases contracted for. It appeared convenient to construct their plant in three large units, one of which later could be done away with. There is no less reason for insisting upon the separate handling of depreciation or the several compressor units at any one plant.

Depletion

The oil industry was made familiar with this term through the operation of the income tax. As applied to producing oil properties there is little misunderstanding of it. It is simply the means whereby return of cost (or value) of oil in the ground is secured free from tax as income, because it is not income at all but return of capital. Gasoline manufacturers gained some benefit from depletion of the value of their "gas contracts" paid in for stock or acquired as a gift of the stockholders; and in some few instances depletion on actual cash cost of gas supply came to light. Changes in the income tax have robbed the tax angle of the subject of its general interest; so instead of considering depletion in its relation to tax matters I will discuss its uses for general accounting and operating purposes.

It frequently happens that a plant is purchased after having been in operation for a considerable period, and all the gas purchase contracts are assigned to the purchaser. The total consideration is often much in excess of the cost to replace the plant with one of like kind and condition; so that deductions for depreciation as defined above would be inadequate to retire the total cost. The excess, or bonus cost of the plant and contracts, is properly chargeable all to contracts, and the retirement of this cost is called depletion. The savings made on this account are to provide for the return of cost of gas supply that is being depleted in the same manner that savings on account of physical equipment are to provide for the return of cost of equipment which will be of small value when the venture is abandoned.

In practice there is seldom any distinction made between depletion of this kind and depreciation. That is, the bonus cost if any, is retired through one account along with the value of the physical equipment. There is no serious objection to handling return of cost in this way; but some advantages develop from keeping the two separate and distinct.

For example, I have found in appraising many plant properties, both for tax purposes and for economic purposes, within the government service and outside it, that where a unit capital cost of gasoline in the ground, much in excess of one-tenth of the market price of gasoline at the loading rack, is used, true profits tend to disappear, or are at best very uncertain. Thus for a gasoline market ranging between 10 cents and 15 cents per gallon, the maximum cost for reserves consistent with profitable operation is about 1¼ cent per gallon. If physical value and bonus cost are lumped together in computing deductions to provide for return of cost, there is no way in which to tell whether or not the amount paid for gasoline in the well exceeds this limit or not. With the two carried separately, and an estimated gallonage reserve set up for computing the true deductions for depletion, it is at once apparent whether or not these limits are being exceeded; and if they are, efforts can be directed to securing additional gas contracts until the increased reserves of gasoline result in a sufficient reduction of the unit cost per gallon. If such an estimate is made prior to the purchase, many a costly mistake can be avoided.

Relation to Earning Power

This brings us to the relation of amortization reserves to earning power and value of the project as a profit making enterprise. The cost per gallon of production for depreciation or other amortization charges as shown in the operating statements of any plant has no bearing on the value of the plant to a prospective purchaser, and should be eliminated from all computations of such value. This does not mean, by any means, that the item of amortization should be neglected in arriving at a proper purchase price. On the contrary, unless return of capital is taken into account in setting a bid price for a plant, a price far in excess of the actual value as based on earning power will be paid without proper compensation. It may be necessary for tactical or strateigic reasons, to pay an excessive price for some one particular property, but the buyer should at least be in the position of knowing what his plant is worth per se, and how much he is paying for the tactical advantage sought.

There are two ways in which the value of a plant based on earning power can be determined, one which can be called the "present worth" method; and the other which can be called the "pay out statement' method. Both these depend primarily upon an estimate of the future annual production of the plant, and will be accurate only to the extent that such estimate is accurate. It is possible to estimate the next year's production within very narrow limits; the second year's production is subject to wider error, and thereafter the estimate for each succeeding year is liable to be more and more inaccurate. Hence that method of valuation which requires the fewest number of estimates of annual production will yield results which will correspond most closely to actual performance. For this reason I prefer the pay out statement method of plant valuation to the present worth method, since in it the estimates for only the succeeding three or four years are included, whereas in the present worth method annual estimates clear down to the probable date of abandonment becomes necessary. Moreover, in the pay out statement method, return of capital is automatically provided for, but in the present worth method it is a very involved function of the projected purchase price.

The effect of amortization of capital cost—whether depreciation or depletion—upon the value of an operating gasoline plant will be seen from the following exposition of the two methods of computing value.

Present Worth Method

After preparing the estimate of future annual production of the plant a selling price per gallon must be chosen which it is believed will be safely within the average for the remainder of plant life. From this average future selling price and the estimated annual production, the estimated annual gross sales are computed. Plant operating costs by years can be estimated either by taking the present cost per gallon as a unit, or by estimating the cost for each year in a lump. The estimated gross profits for operation in each year are the differences between these two figures. The sum of these differences for the estimated number of years of plant operation is the total gross operating profit of the plant. But these profits are received, not in a lump sum immediately, but in annual installments spread over a period of years. They are therefore not now worth par. A compound discount factor of 10 per cent for the present worth of these annual installments is generally used. Each installment is therefore discounted by its proper factor, and the sum of these products is the present worth at 10 per cent of the gross operating profits. But these figures do not include depreciation or depletion. For simplicity, this is generally provided for by deducting from the last sum above mentioned, the appraisal value of the plant equipment or reproduction cost new less actual physical deprecia-

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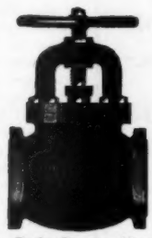

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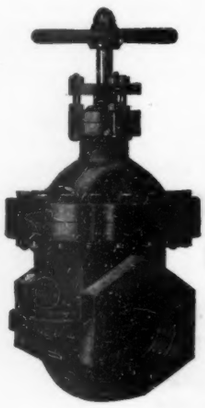

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Dallas, Texas

tion, leaving a balance which is said to be the value of the earnings of the plant.

In reality I believe that this figure is a combination of the value of the net earnings plus the bonus value of the gasoline in the ground, since annual earnings of only 10 per cent on cost are not sufficient to induce capital to flow into this business. If a higher discount rate than 10 per cent is used, say 15 per cent or 20 per cent, or some rate which may be considered adequate and attract capital, the present worth value of the gross profits shrinks so rapidly that they soon equal the appraisal value of the plant, at which point all bonus value disappears. Due to the operation of the compound discount all the factors of such a valuation are so involved as to have their relation, each to each, obscured, and the relatively large number of years which have to be included in the estimates of both annual production and future average selling price tend to rob the appraisal of its value. A further objection is the necessity which exists of choosing a discount rate, which must be done altogther arbitrarily. This makes the entire computation subject to the accuracy of still another guess. Such an appraisal is still further open to attack upon technical grounds, as the manner of using compound discount, and varying opinions are held by experts yielding quite different results from the same basic figures.

Many Rates Not Considered

This method of plant appraisal does not concern itself at all with present worth or money rates or rates of earning which may be called satisfactory. It seeks only to determine the total actual amount of gross operating profits necessary to return a given capital outlay within a given period of time. If all or most of the gas contracts under which a gas supply for the plant is obtained expire or are cancellable on short notice after, say the middle of the second year hence, no one would think of investing in the plant a sum greater than could be recovered from gross operating profits within the next three years at the outside. It is therefore necessary only to use the estimated annual production for the next three years in determining the amount of these gross profits, and this figure can be approximated much more closely than an estimate involving the next seven or eight years. Also a guess at the future average selling price for the next three years is much more valid than one covering the longer period and it is not necessary to assume a satisfactory rate of earning before proceeding with the appraisal.

The operating statement of the plant is then resorted to. The cost per gallon for gas is divided by the average selling price per gallon over the same period, and the chosen future average selling price per gallon is multiplied by this ratio to determine what will be the cost of gas at that plant with gasoline selling at the chosen price. From the total cost per gallon on the operating statement are deducted the following unit costs: Cost of gas per gallon of gasoline, cost of depreciation per gallon of gasoline, cost of overhead per gallon of gasoline, leaving a balance which is actual plant operating cost per gallon. To this is added back the new gas cost arrived at as above described, and the purchaser's gallonage overhead charge, but no depreciation, since the depreciation (or total amortization of capital cost) is dependent solely upon the price paid, which is the figure we are seeking. The total of these costs is then the estimated manufacturing cost of gasoline under the market conditions chosen. Deducting this from the chosen future average selling price, there is left a future average gross profit per gallon. This multiplied by the estimated annual production for the next three years gives the estimated gross profits from operation at the end of three years. This then is the most that can reasonably be paid for the plant, and if it exceeds the physical appraisal, the excess is cost of gasoline in the ground. The value thus derived is the value for this plant to "pay out" in three years, provided that market conditions approximate the estimated selling price. If the project must then be abandoned through inability to renew contracts, the buyer will at least have received his money back and will still have the salvage in the plant for his profit. If the project can be continued, all gross profits after the third year will be true profits and will represent the purchaser's return on his investment. By whichever method value is computed, the values arrived at are much lower than are supposed or alleged by many to prevail.

ECONOMIC VALUE OF NATURAL GASOLINE

(Continued from Page 86)

sists on high gravity gasoline, 64-66 and 60-62 gravity, it will not only take a large percentage of high-grade natural gasoline to blend for these grades, but even more so to make domestic motor fuel from the remaining naphtha after the lighter hydrocarbons have been taken out for export grades.

However, we must not neglect the fact that the foreign buyers and public are becoming aware that they are paying too much for these high gravity export grades; refining capacity in England and her colonies is increasing continually, and more gasoline is produced annually by these refineries abroad. They will encounter and meet the same problems as we have in America and educate the motoring public to the use of lower gravity motor fuels. Already more 58-60 gasoline is imported into Europe each year in place of 60-62 or 64-66. Foreign engineers and chemists are working with all energy and diligence on "substitutes" for gasoline as suitable motor fuels. But even should the export market for gasoline fall off, the domestic demand for motor fuel will increase and in all probability offset such a decrease in foreign shipments.

CENTRAL WEST

(Continued from Page 136)

pective territory to play upon. Wabash County has been the standby for a couple of years, but plenty of dry holes are being encountered in looking for production and in spots least expected.

The wildcat venture of E. G. Mason and others near the town of Tilden in Randolph County and not far from Sparta, got a showing in the Mississipian lime formation at a depth of 1,200 feet and after given a shot looks like a 1-bbl. producer. Bill Goddard and others who are drilling on the McElroy farm, near Sparta, are delayed by a fishing job.

The test of the Oldham Dome Oil & Gas Co. on Ohlman Dome, near Nokomus, in Montgomery County, proved a failure. Two failures are also reported from Morgan County.

No. 2 well on the Stoneking farm, in the Plymouth-Colmar Fields of McDonough County, drilled by unknown parties, is reported dry, but No. 3 is being drilled.

The Upton Oil Co.'s second test on the William Freeland farm, Section 15, Grandville Township, Jasper County, is reported at 5 bbls.

In Centralia Township, Marion County, Floyd Alspach and others' No. 4 in the southeast corner of the Charles Rowekamp lot, Section 30, is dry.

Only three wells are reported drilling in Clark County. The Ohio Oil Co. is drilling No. 25 on the J. S. Phillips, Section 18, Parker Township. In Westfield Township, Adkins and others are drilling No. 1 W. R. Shuey, Section 31, while in the Stray sand pool, in Martinsville Township, the Mahutska Oil Co. is drilling No. 3 Harriette Slater, Section 30.

In Crawford County, Licking Township, the Peoples Banking & Trust Co.'s No. 3 Silas Wilkin, Section 4, is good for 1 bbl. In Martin Township, the Ohio Oil Co. abandoned No. 10 G. B. Hicks heirs, Section 34. The Mahutska Oil Co. is drilling No. 17 O. R. Smith, Section 30, Oblong Township. In Robinson Township, the Canadian Oil & Gas Co. is drilling No. 15 on the E. E. Newlin, Section 31. In Russell Township, Hartman and others are at work at a test on the A. J. Vaught, Section 3. In Honey Creek Township, the Selby-Cisler Producing Co. is drilling No. 27 Claudia A.

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TULSA, OKLAHOMA

Reavill farm, and Phipps Cawood and others are drilling No. 7 L. N. Tohill. McNally & Starr are getting ready to start No. 7 Amelia E. Joseph farm, Section 23, Prairie Township, and in Montgomery Township, Walter Squires and others are drilling No. 9 G. B. Ford, Section 15.

Phipps and others are working on a test on the James Armstrong farm, Section 30, Dennison Township, Lawrence County, almost directly north of Allendale, while Art Smith and others are drilling a wildcat on the George Smith, Section 27, same township, and northwest of the Allendale Field. The Treat-Hays Oil Co. is drilling No. 1 on the Thomas Taylor, Section 11, while the Ohio Oil Co. is drilling No. 11 Elydia Ridgeley farm, same section.

Wabash County

Production of the Price well, drilled in Friendsville Township, Wabash County, and a mile or so southeast of Friendsville, drilled by Joe S. Young, Jr., and others, is proving to be an exceptionally good well, being estimated at 80 bbls. flush at first. There has been considerable delay in getting the well on the pump, but they were finally successful, and the first eight hours pumping is reported to have put 105 bbls. in tankage. The well of Clark, Oldendorf and others on the J. O. Wood, an offset to the east of the discovery well on the Bass farm, Section 19, makes a fine showing, but is not yet in shape to even estimate its value, although it is said to have showed as good as the Bass well, which produced around 200 bbls. flush. No. 2 on the Bass farm, drilling by Healey & Lee has run the 8-inch casing to a depth around 900 feet and should drill in withing a week or so. Joe S. Young, Jr., and others' second well on the Price lease, Section 19, an offset to the well on the Franklin school lot, northwest a short distance from the Bass well is also due within several days.

In Wabash Township, the Dane Oil Co.'s No. 4 well, 600 feet from the north line and 1,400 feet from the west line of the Holson-Dorney lease, Section 18, is reported at 10 bbls. Depth to sand, 1,515 feet and drilled 8 feet in the sand. The Max Oil Co. is drilling No. 7 on the Holson-Dorney lease, same section.

Ellison and others' second well, 600 feet from the south line and 300 feet from the west line of the Collison heirs farm, in the southeast quarter of Section 12, is a dry hole at a depth of 1,623 feet. Hupp, Duff and others are drilling No. 1 J. W. Price estate, Section 14. Black Gold Oil Co. is drilling No. 4 J. T. Smith, Section 22. Mahutska Oil Co. is drilling No. 6 F. Stillwell, Section 12, and Mayhugh and others are drilling No. 4, Kogan heirs, Section 1.

The Mt. Carmel Republican-Register says: "T. H. Puryear, who has associated with him local interests and interests from outside Mt. Carmel, is promoting oil development in this territory to the north of Mt. Carmel, with a view of sinking a well in the near future. The Clay Moeller farm, on which the site of the ancient town of Palmyra is located not far from the mouth of Crawfish Creek, has been leased. Mr. Puryear and those associated with him expect to complete plans for sinking a well on this lease within a short time.

"What is declared to have been possibly the first oil test made in the county, a good many years ago, remembered by the old-timers interested in early developments of the oil industry of Illinois, was on this tract of land. It was drilled on a spot that is now believed to be covered by the state road, some distance north of where it crosses the creek. The well went down to something over 1,000 feet and according to information handed down there was oil production, but as the price of the fluid was so low in those days and it was so far to the nearest pipe line it was not in paying quantities and so the well was abandoned. The promoters are hopeful of finding good production in this area."

Central Ohio

Two nice gas wells were reported from the Cleveland Field in Cuyahoga County, and it looks very much as though the territory would have a comeback after several years of quietude. It was at one time one of the best gas producing areas in the central Ohio area, when the heavy development was made around West Park to the western edge of the city of Cleveland. One of these wells was drilled by McGrath and others on the J. C. Lemmon 30 acres, Section 29, Dover Township, and 75 feet from the south line and 725 feet from the east line of the lease, with a flush volume of 2,700,000 feet. The other was drilled by Hulse & Kundtz near the northwest corner of the H. Mitchell 30 acres, Section 28, and estimated around 2,000,000 feet. The Preston Oil Co. is drilling a test on the southwest corner of the F. A. Watson 10 acres, Lot 48, same township.

In Middleburg Township, Guyahoga County, the East Ohio Gas Co. made a location 629 feet from the north line and 120 feet from the west line of the P. and A. Jenke 12 acres, Lot 15. This company is drilling two tests in Strongville Township, same county. One is 1,200 feet from the south line and 1,000 feet from the west line of the E. I. Gifford 170 acres, Lot 87, and the other in the southeast corner of the B. H. and E. A. Dams 108 acres, Lot 50.

The Logan Gas Co. drilled in an exceptionally good gas well at its test 650 feet from the north line and 625 feet from the south line of the Frank Firestone 80 acres, Section 27, Hanover Township, Ashland County, Same company made a location for a test 1,100 feet from the north line and 600 feet from the west line of the William H. Brandt 252 acres, Section 2, Orange Township.

In Montville Township, Medina County, the Ohio Fuel Gas Co. made a location for a test on the B. Lambert McFadden 41 acres, Lot 50. Same company made a location for a test on the northwest corner of the R. O. Wheeler 88 acres, Lot 36, Lafayette Township, same county and also for a test in the northwest corner of the Albert Trefany 38 acres, in Liverpool Township.

In Lorain County, Columbia Township, the Empire Gas & Fuel Co. struck a duster at a test on the Ruth A. Rogers, Lot 52, and made a location for a test in the northwest corner of the S. A. Ives 57 acres, Lot 93. In Ridgeville Township, the Logan Gas Co. found a duster at a test 1,500 feet from the north line and 500 feet from the west line of the A. H. Atkinson farm of 80 acres, Section 3, and the Edson Company met with the same luck in a test 875 feet from the north line and 100 feet from the west line of the J. Miller 39 acres, Section 26, Avon Township, same county.

Wayne County

In Wooster Township, Wayne County, the Ohio Oil Co.'s No. 4 well, 350 feet from the north line and 1,525 feet from the east line of the William M. Orr 73 acres, Section 21, is a nice Newburg sand gasser. The Logan Gas Co. drilled a duster at a test 1,178 feet from the north line and 84 feet from the east line of the D. W. Hemming 85 acres, Section 19, Milton Township, and found one of the same stripe in a test in the center of the W. Rathburn 165 acres, Section 34, Chester Township. In Wayne Township, W. E. Hawk and others are drilling a test in the southwest corner of the J. B. Yoder 40 acres, Section 1.

In Holmes County, Prairie Township, the Empire Gas & Fuel Co. drilled a duster in a second test in the southwest corner of the W. H. Miller 159 acres, Section 9. In Monroe Township, the Ohio Fuel Gas Co. is drilling a test in the northeast corner of the Lizzie Rambacher 79 acres, Lot 16. In Hardy Township the Empire Gas & Fuel Co.'s No. 2 well, 300 feet from the north line and 925 feet from the east line of the Jesse P. Close 55 acres, Section 5, and made a location for a test in the southeast corner of the Lewis Donald 24 acres, Section 12. East Ohio Gas Co. made a location for a test in the southeast corner of the Sanford Carpenter 67 acres, Lot 4.

In Guernsey County, Adams Township, the Ohio Oil Co. drilled a good gas well in a second test on the James Mercer 160 acres, Section 13, and a fairly good gas well at a test on the Walter T. Mehaffey, same section.

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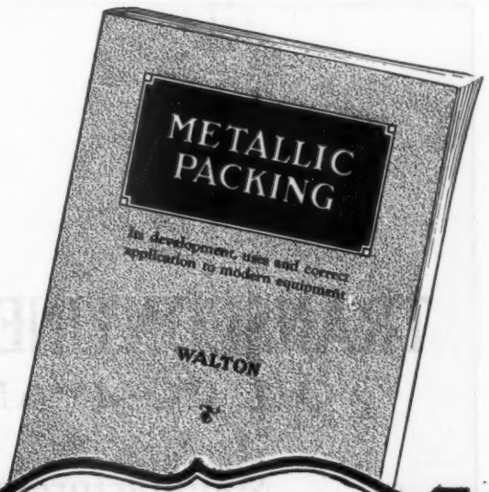

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Charles F. Farren, Oklahoma Producer, Is Called By Death

Charles F. Farren, successful oil producer in the Oklahoma Field, and one of

Charles F. Farren

Tulsa's civic leaders, died at St. Johns Hospital in Tulsa on Saturday, from an intestinal ailment, the seriousness of which was not known until he became acutely ill on Friday and underwent an operation.

The news of Mr. Farren's death was a great shock to his host of friends and admirers in Tulsa. He was well and favorably known among oil men and his great interest and active participation in civic affairs made him an outstanding citizen—one whose death was looked upon as a distinct loss to the community.

Mr. Farren had operated in the Mid-Continent Field since 1912, and had assisted in the development of several important pools, including the Jennings extension, Stroud, Bristow, Henryetta and Yale. He was born in Indiana, Pa., in December, 1874. He went to Pittsburgh in his early manhood and for several years was connected with the Mellon banking interests and the Gulf Oil Corp. He took part in the big development following the opening of the Robinson, Ill. Field, and when that had quieted down came to Tulsa as general manager of the Guffey & Gillespie Co. with which firm he remained until 1918.

Mr. Farren's first distinct personal success as a producer was in the Jennings extension in partnership with the Tidal Oil Co., J. H. Markham, Jr. and T. J. Wood. This made it possible for him to get into the production end of the business in real earnest and his long field experience and good business judgment aided him in profiting very materially by his operations.

Mr. Farren is survived by his widow, Mrs. Monica Rutherford Farren, and one son, Charles Rutherford Farren; a sister, Miss Mabel C. Farren of Pittsburgh and two brothers, Harry H. and Frank B. Farren of Pittsburgh.

CALIFORNIA MARKET REPORTED WEAKENED

LOS ANGELES, Calif., May 1.—The domestic demand for motor gasoline weakened somewhat during the past week, due primarily to a continued stretch of cloudy, cool weather. The prices of poorer grade gasoline are also weaker. The price to service stations as quoted by some of the smaller refiners has fallen off as much as ½ cent in some cases. So-called "bootleg" gasoline can be bought at the present time delivered into service station tanks at as low at 5½ cents under the retail price of gasoline. This is a full cent and a half under the price posted by the Standard Oil Co. of California. This company is selling gasoline through its service stations at 20½ cents (tax included) in Los Angeles, while its tank wagon price is 16½ cents, a differential for the service station of 4 cents per gallon compared with 5½ cents for "bootleg" gasoline.

On the other hand, shipments of California gasoline to the Atlantic seaboard showed an increase. During the past week approximately 260,000 gallons of gasoline were shipped East. With the heavy summer demand about to set in, exports of California gasoline to both eastern and Gulf ports are expected to hold up very well.

The natural gasoline market continues soft. This situation is not expected to last for long, however, as the recent increases in gasoline prices east of the Rockies with further increases expected will necessarily improve the price of Oklahoma natural gasoline and eliminate this commodity from competition with local natural gasoline. With Oklahoma natural gasoline out of the local market, the position of natural gasoline will strengthen very quickly.

The fuel oil market remains strong. During the past week almost 295,000 bbls. of fuel oil moved out of Los Angeles harbor for the Atlantic seaboard. During the same period about 415,000 bbls. were shipped to Buenos Aires in South America. The consensus of opinion among local oil men is that the fuel oil market has hit bottom and is now on its way up again.

Shipments of kerosene to China are falling off somewhat due to heavy cancellation of kerosene orders. It is reported that the Chinese kerosene market is pretty well saturated with California kerosene at present.

UNCLAIMED OIL FUNDS FOR FLOOD CONTROL AID

By Charles E. Kern
Washington Bureau
The Oil and Gas Journal

WASHINGTON, D. C., May 1.—Senator Harreld of Oklahoma has introduced a bill (S-4107) authorizing and directing the Secretary of the Interior to make disposition of funds derived from oil wells in Oklahoma, where there are no legal claimants, so that all sums of money derived from these wells in the bed of the Red River, Oklahoma, coming under the jurisdiction of the United States under the decision of the Supreme Court in the case of Oklahoma vs. Texas, rendered May 1, 1922, being proceeds from oil wells in which there are no legal claimants, shall be set aside in a special fund known as the Oklahoma flood control fund. The secretary is directed to have made a survey of such rivers as he may designate from time to time in the State of Oklahoma and to protect contiguous land bordering on such streams from flood waters. This bill has been referred to the Committee on Public Lands and Survey.

NEW HEAD ELIMINATES GAS AND CASING CLAMPS

Casing or gas packing clamps formerly used in connection with the suspension of strings of casing in wells have been eliminated by the introduction of the Regan pipe suspension and control head, designed and manufactured by the Regan Forge & Engineering Co., of San Pedro, Calif. The Regan head, it is claimed, gives the operator a simple and very effective method of retaining the desired suspension in the casing strings after making surface landing and casing had been set, thereby eliminating the use of the old style casing or gas packing clamps formerly used for this purpose.

DOHENY HEARING ADVANCED

WASHINGTON, D. C., May 4.—The Supreme Court of the United States has advanced the appeal of Edward L. Doheny to set aside the decision of the Federal courts in California canceling his oil leases for hearing on October 4.

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These desirable results are obtained by a careful control of the distillation range of our product and high heat transfer resulting from low molecular weight of our product.

The number of companies using *"Sunoco" Absorption Oil* is proof of its unquestionable quality. We ask an opportunity of supplying you with your future requirements.

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SUCCESSFUL YEAR IN GASOLINE INDUSTRY

(Continued from Page 77)

cases, cannot fail in the long run to react harmfully on the industry as a whole and upon the originator, if he is fortunate enough to remain in the business. This result must follow because such transactions soon become known generally in the industry and thereafter the premium will be considered as part of the prevailing market price and efforts will be made to obtain a still greater premium on later transactions.

At the present time, a fairly large number of casinghead gas producers and some manufacturers have apparently been convinced that the financial sting has been extracted from the business of manufacturing of natural gasoline by the advent of the misnamed "portable plant." With no intention of criticising the manufacturers of such equipment, except possibly for their use of the term "plant," it should be pointed out that the cost of such units usually only covers from one-fifth to one-tenth of the final cost of the completed gasoline plant when the necessary gathering system, compressor equipment, storage tanks, loading out facilities, water system, building and other essential auxiliaries are taken into account. The only field that these units, consisting of an absorber, still, coolers and minor auxiliary equipment can successfully lay claim to from a financial point of view, is for use in newly discovered fields where the ultimate amount or probable life of the gas supply is yet undetermined, and where the gas can be passed through the absorber with little or no investment in compressors and with a limited gathering system requirement. Under such conditions it can be fairly stated that such equipment will make possible the utilization of some of the flush gas which would otherwise be wasted while the larger capacity, but more economic, permanent plant is being constructed.

I wish also to extend my thanks to our associate members, the equipment manufacturers who have contributed their financial assistance to the association. I bespeak for them your continued patronage.

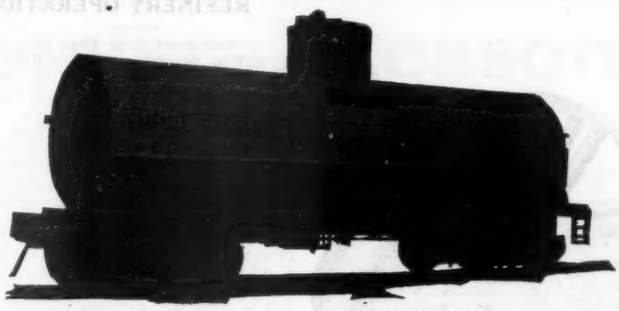
REGISTRATION

(Continued from Page 77)

R. E. Cornell, Carbide & Carbon Chemical Corp., Tulsa.
B. H. Wilson, Fort Worth Laboratories, Fort Worth, Tex.
C. E. Ramiers, Phillips Petroleum Co., Wetumka.
C. F. Le Fevre, Empire Gas Co., Bartlesville.
C. J. Payton, Sinclair, Tulsa.
L. E. Frazier, Phillips Petroleum Co., Bartlesville.
O. S. Ambrose, Tidal Refining Co., Tulsa.
A. D. Cooper, Tidal Refining Co., Tulsa.
C. W. Zimmerman, Tidal Refining Co., Tulsa.
Neil Williams, The Oil and Gas Journal, Tulsa.
E. L. Peck, Empire Gasoline Co., Bartlesville.
Fred Dorney, Phillips Petroleum Co., Bryant.
J. D. Harris, Phillips Petroleum Co.
E. A. Wooden, Sinclair Oil & Gas Co., Tulsa.
A. C. Holmes, Empire Refining, Inc., Tulsa.
R. E. Stewart, Barnsdall Refining Co., Inc., Tulsa.
R. A. Routsong, Gypsy Oil Co., Drumright.
M. I. Shigley, Crown Central Petroleum Co., Tulsa.
E. C. Cook, Oil State Gasoline Co., Beggs.
W. A. James, Cushing Refining & Gasoline Co., Cushing.
S. Nray, Comar Gasoline Co., Marland.
W. F. Buchanan, Comar Gasoline Co., Marland.
J. P. Mulkern, The Oil and Gas Journal, Tulsa.
James W. Gray, The Texas Company, Tulsa.
M. Farnsworth, Texas Pacific Coal & Oil Co., Fort Worth, Tex.
H. M. Kerr, Phillips Petroleum Co., Bartlesville.
J. H. Wood, Phillips Petroleum Co., Bartlesville.
S. J. Frazier, Prairie Oil & Gas Co., Independence, Kans.
W. G. Clute, Prairie Oil & Gas Co., Independence, Kans.
A. Neill, Prairie Oil & Gas Co., Ranger, Tex.
N. M. Jones, Prairie Oil & Gas Co., Independence, Kans.
F. E. Shryock, Roxana Petroleum Corp., Tulsa.
M. R. Church, Roxana Petroleum Corp., Tulsa.
E. S. Quinn, Roxana Petroleum Corp., Tulsa.
R. H. Cosby, Roxana Petroleum Corp., Tulsa.
C. C. Bender, Phillips Petroleum Co., Beggs.
George E. Grimer, Phillips Petroleum Co., Beggs.
E. S. Moore, Prairie Oil & Gas Co., Midwest, Wyo.
S. B. Crooks, Empire Gasoline Co., Bartlesville.
E. H. Schoenfeldt, Empire Gasoline Co., Bartlesville.
E. Reed, Phillips Petroleum Co., Wetumka.
A. H. Evans, Akin Gasoline Co., Tulsa.
M. E. Foster, Phillips Petroleum Co., Bartlesville.
H. F. Wheeler, Gypsy Oil Co., Kiefer.
E. E. McCollum, Phillips Petroleum Co., Pershing.
O. A. Carter, Phillips Petroleum Co., Pershing.
Jot Davis, Beggs Oil State.
J. H. Johannes, Phillips Petroleum Co., Cromwell.
Cornelius Kroll, Looboyle Refining Co., Tulsa.
H. R. Campbell, Phillips Petroleum Co., Bartlesville.
J. W. Hurley, Hurley Gasoline Co., Tulsa.
M. L. Atkinson, Phillips Petroleum Co., Wetumka.
D. E. Foster, Tulsa.
George F. Carey, Phillips Petroleum Co., Bartlesville.
F. W. Little, Phillips Petroleum Co., Wetumka.
Lestor B. Wood, Phillips Petroleum Co., Breckenridge, Tex.
E. L. Utsinger, Phillips Petroleum Co., Breckenridge, Tex.
O. F. Kluenter, American S. & B. Corp., Tulsa.
C. S. Simon, Midwest Pipe & Supply Co., Tulsa.
F. B. Yonker, Chestnut & Smith, Ranger, Tex.
H. R. Dean, Tulsa.
James W. Cowles, Roxana Petroleum Corp., Tulsa.
V. C. Canter, Gaso Recovery Corp., Tulsa.
C. E. Purdy, Gilliland Oil Co., Tulsa.
C. L. Baker, The Texas Company, Tulsa.
C. H. Campbell, Lone Star Gaso Co., Dallas.
Thad Wilson, Tulsa.
A. M. Ballard, Twin States Oil Co., Tulsa.
W. E. DeYarmett, Tulsa.
N. M. Weir, Tulsa.
M. A. Bigelow, Orifice Gaso Co., Tulsa.
T. J. Crowley, Oil and Gas Journal, Tulsa.
E. L. Ford, Phillips Petroleum Co., Shidler.
C. E. Cadman, Bell Oil & Gas Co., Tulsa.
W. G. Manness, F. E. Gilmore Co., Fort Worth, Tex.
J. H. Boyle, Chestnut & Smith, Tulsa.
H. O. Parker, Mathieson Alkali Works, New York.
Clay Briggs, Empire Co., Bartlesville.
D. W. Bow, I. T. I. O. Co., Bartlesville.
M. D. Fitzgerald, Okla Gaso Plants, Inc.
J. F. Hogan, Rock Island Lines, Chicago.
H. E. Hurst, Rock Island Lines, Tulsa.
B. A. Whitney, Transcontinental Oil Co., Tulsa.
H. R. Auerswald, Gypsy Oil Co., Tulsa.
W. E. O'Mella, Westcott & Greis, Tulsa.
F. I. Thompson, Westcott & Greis, Tulsa.
George C. Davis, G. M. Davis Regulator Co., Chicago, Ill.
R. E. Baker, Roxana Petroleum Corp., Drumright, Okla.
F. T. Lundy, Roxana Petroleum Corp., Tulsa
C. J. Fowlston, Roxana Petroleum Corp., Tulsa.
A. E. Hays, Roxana Petroleum Corp.
F. B. Dunlap, Bessemer Gas Engine Co., Tulsa.
Frank J. Paterson, Mid-Continent Petroleum Corp.
C. J. Heim, Eagle Picher Lead Co., Henryetta.
H. A. Mentzel, Victor Gaso Co., Tulsa.
E. C. Sager, Victor Gaso Co., Tulsa.
Forest E. Gilmore, F. E. Gilmore Co., Tulsa.
F. N. Bennett, F. E. Gilmore Co., Tulsa.
J. M. Williams, Phillips Gasoline Co.
Palmer Hughes, Simms Oil Co., Dallas, Tex.
G. Blanchard Smith, Westcott & Greis, Tulsa
V. N. ————, Sand Springs Home, Gas Department, Oilton.
Perry Christlick, Sand Springs Home, Gas Department, Oilton.
P. P. McKirahan, Continental Tank Car Co., Tulsa.
F. W. McGrath, Skelly Oil Co., Tulsa.
R. D. Pearce, Skelly Oil Co., Tulsa.
Earl L. Mabry, Phillips Petroleum Co., Cromwell.
H. L. Berkey, Sharples Specialty Co., Tulsa.
R. O. Wikoff, Highway Oil & Refining Corp., Tulsa.
C. M. Bryson, Bellby Natural Gasoline Co., Electra, Tex.
S. E. Griffith, Bellby Natural Gasoline Co., Tulsa.
John E. Casey, Acme Tank Car Co., Coffeyville, Kans.
H. A. Trower, Phillips Petroleum Co., Bartlesville.
J. F. Lawrence, Phillips Petroleum Co., Tulsa.
G. R. Curtis, Shaffer Oil & Refining Co., Oklahoma City.
Frederick A. Frank, Max B. Miller Co., Inc., Tulsa.
C. J. Minnig, Phillips Petroleum Co., Bartlesville.
S. B. Myers, Independent Oil & Gas Co., Tulsa.
L. M. Klein, Gypsy Oil Co., Tulsa
L. G. Post, Gypsy Oil Co., Tulsa.
W. A. Melton, Shaffer Oil & Refining Co., Tulsa.
W. F. Reich, Jr., Carbide & Carbon Chemicals Corp., Tulsa.
D. G. Mechling, Tidal Refining Co., Tulsa.
O. J. Tuttle, Empire Refining, Inc., Tulsa
D. W. McKay.
Floyd C. Brown, Empire Companies, Bartlesville.
G. H. Hannum, Mid-Continent Petroleum Corp., Tulsa.
W. N. Corbet, Eagle Picher Lead Co., Henryetta.
W. K. Warren, Warren Petroleum Co., Tulsa
W. M. Welch, Tulsa.
E. H. Poe, Tiger Mountain Oil Co., Tulsa.
H. W. Roe, Mid-Continent Petroleum Corp., Tulsa.
C. R. Burke, Phillips Petroleum Corp., Tulsa
S. R. Stone, Gasoline Engineering Co., Tulsa.
D. S. Hulse, Forest E. Gilmore Co., Tulsa.
Fred N. Bennett, Forest E. Gilmore Co., Tulsa.
F. N. Taylor, Tiger Mountain Oil Co., Tulsa.
F. E. Rochardson, Parco, Wyo.
C. L. Wingate, Prairie Oil & Gas Co., Tulsa.
W. H. Elliott, Black Sivalls & Bryson, Tulsa.

(Continued on Page 152)

Quality



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FACTORS AFFECTING REFINERY OPERATIONS

(Continued from Page 32)

so with a favorable price situation it would be more profitable for the refiner to secure the greatest yield of the highest price product.

The question of price enters at this point and as is shown in the tables often completely changes the situation brought about by the ability of the manufacturing division of a refinery to secure a larger percentage of gasoline.

Consideration of the data in regard to gasoline which is summarized in Table 2, will illustrate the dependence of refinery revenue on yields and prices. It will be noted that although gasoline yield from crude increased from 30.9 per cent in 1923 to 33.1 per cent in 1924, that the percentage of gasoline revenue to the total refinery return was greater in 1923 than in 1924. In other words, although refiners secured approximately .924 gallons more from each barrel of crude oil in 1924 than in 1923, the returns from gasoline for the year were not as important a part of the average refiner's total return.

Importance of Price

The explanation, of course, lies in the difference in prices. The average per gallon price for gasoline in 1924 was .1045 cents and .1132 cents in 1923. The average price on kerosene and fuel and gas oils, on the other hand, was greater in 1924 than in 1923, as is shown in Table 2. Another way of illustrating this situation is by comparing the per barrel value of the refined products. Refiners in 1924 secured an average of $2.829 for each barrel of crude refined, and in 1923 an average of $2.792. Thus with a slightly higher crude price in 1924, refiners secured only $1.454 of gasoline from each barrel of crude oil charged to stills while in 1923 the gasoline return averaged $1.474.

The gasoline situation changed in 1925 when average gasoline prices were higher than in 1924. Due to these higher prices and also the fact that gasoline recovery increased from 33.1 to 34.9 per cent, the percentage value of gasoline increased to 54.7. The kerosene percentage at the same time decreased from 8.2 per cent in 1924 to 6.4 per cent in 1925. This decrease in the relative importance of kerosene is explained in the columns of Table 2, which show that the percentage of gasoline recovery decreased from 9.3 per cent in 1924 to 8 per cent in 1925.

The same trend developed in regard to fuel oil. The percentage value of the whole for fuel and gas oil decreased from 25.7 per cent to 22.9 per cent in 1925. This situation developed despite the fact that average fuel and gas prices was slightly higher in 1925 than in 1924. The decreasing importance of fuel and gas oil was due both to a decrease in yield in 1925 and also the increasing value of gasoline.

Wax Yields and Wax

The mutual dependence of yield and prices is also clearly shown in the case of wax, one of the by-products in refinery operations. In 1923, with an average price of .0291 cents per pound the yield was only .85 per cent of the crude runs to stills.

In 1924, the price situation suddenly changed due to a large increase in demand and refiners in many areas were able to secure almost double their 1923 prices. The average price per unit in 1924 was .0518 cents per pound. This was immediately reflected in yields which increased in 1924 to 1.4 per cent. The same situation continued through 1925. Wax is a minor product but the comparative data just given show that refiners can greatly increase yields when the price justifies the increased cost.

Lubricants, on the other hand, with practically no change in price during the past three years have had relatively little change in yields. The average price in 1925 was .155 cents, .154 cents in 1924 and .1439 cents in 1923. The yields were 4.2 per cent in 1925, 4.3 per cent in 1924 and 4.5 per cent in 1923.

Developments so far this year show that the general price situation under way during 1923, 1924 and 1925 continues. Refiners are continuing to increase their gasoline yields despite low prices. At the same time due to decreasing yields prices on all products which come under the classifications of kerosene and gas and fuel oils are advancing in price.

At the present time in Oklahoma, with a 10¼ to 10½-cent price on U. S. Motor gasoline, kerosene prices are 7½ to 8 cents with an average fuel oil price around $1.50 per barrel. This relative price situation has never before existed in the Mid-Continent or in any other area.

It is probably an inevitable economic development made possible through the ability of the manufacturing division of the petroleum industry to secure gasoline from fractions formerly sold at a relatively lower price. By continuing to sell their gasoline at constantly lower prices it is obvious, however, that refiners are losing a part or the whole of the benefit to which they are entitled through more efficient operations.

The fact that higher prices are being received for other products is not necessarily of any significance from the standpoint of profits when the decreased yields are considered and lower per unit returns from gasoline. As given in Table 1, the average return to the refiners per barrel of crude oil run to stills was $3.177 in 1925, $2.829 in 1924, and $2.792 in 1923. These comparative figures, however, are also of no value as indicating profits until the comparative crude oil and operating costs for the three years are known.

Just where this tendency to increase the recovery of one product at the expense of others stops, will continue to depend on prices for crude oil and the several refined products. As shown in Table 2, fuel and gas oils representing 49.1 per cent of the crude runs to stills only represented 22.9 per cent of the total revenue. Based on present known methods of processing the greater part of this 49.1 per cent of fuel and gas oil can be refined into gasoline provided the relative price situation for the products justifies.

There are at least a few instances which can be cited where refiners have recently found it more profitable to operate their plants so to increase their gas oil, fuel oil or kerosene yields rather than attempting to secure the maximum gasoline content possible with their refinery equipment. A continuance of the present price relationship will undoubtedly have some effect on yields of the entire country.

REFINING IS BECOMING MORE CONCENTRATED

(Continued from Page 29)

30 per cent above its capacity. Several refiners in the Mid-Continent Field in making their monthly reports to The Oil and Gas Journal on crude runs to stills, have occasionally shown a greater actual throughput than the rated capacity of their plants.

Crude capacity as now used is a relative term depending entirely on marketing conditions. Since the latter are constantly changing the capacities also fluctuate. The plant owners have given their plants rated capacities but when price conditions and demand justify can usually exceed this maximum figure. Those in touch with the situation have estimated that if the demand should ever arise operators considered as a unit by concentrating all their equipment including cracking for the skimming of crude oil could increase the crude throughput of their plants at least 50 per cent and still secure as large yields of gasoline and kerosene as were obtained at the most efficient refineries a few years ago.

Cracking Facilities

The statement that the total number of operating refineries with cracking equipment is no greater than last year will come as a surprise to many. Cracking was the manufacturing process which received the most widespread consideration among refiners during the past year

Several Reasons Why

Homestead Hovalco Blow-Off Combination meets requirements of A. S. M. E. Code and State Laws.

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Cosden & Co.
Standard Oil Co.

1. Unobstructed passage to carry off sediment.
2. Seat of the Homestead quarter turn valve is not exposed while blowing down.
3. Wear affects the seat and discs of Hovalco valve only, which parts can be easily repaired while boiler is under pressure.
4. Seats and discs of Hovalco can be reversed, reground, or renewed quicker than in any other valve. (Seat not screwed into body.)
5. Seats and discs of Hovalco require no special castings. Either part can be quickly made in any machine shop (if necessary) out of a piece of solid metal.
6. Ball seat of Hovalco insures a tight joint. Seat and disc cannot get out of line.
7. Experience shows that the Homestead Hovalco Combination requires less attention, and remains tight longer than any other combination known.

HOMESTEADS cost less in Dollars per year.

Also made of Cast Steel for higher pressures and temperatures

Homestead Valve Mfg. Co.
Homestead, Pa.

Homestead Valve Manufacturing Company, Homestead, Pa

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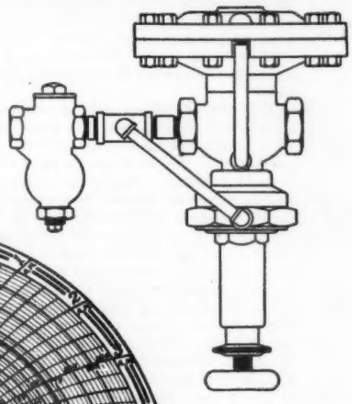
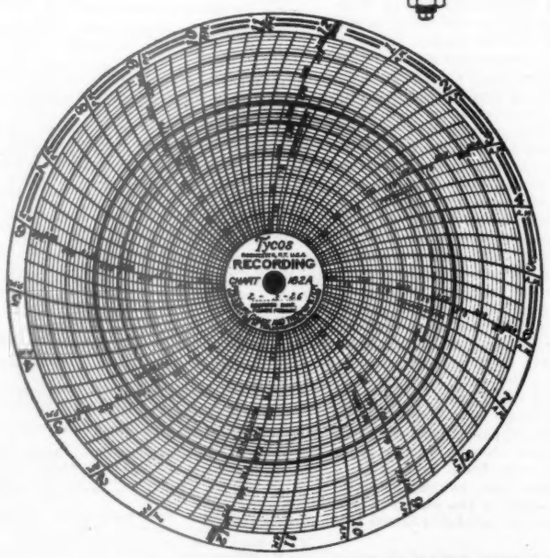
The circle shown on the chart is as nearly perfect as any one could desire, and registered this perfect control throughout a 24-hour service.





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and it has been assumed that the number of plants with cracking equipment had increased.

It is true that several plants located in different parts of the United States installed cracking equipment for the first time during the past year. This increase in numbers, however, has been offset by plants which have shut down. A year ago several concerns in making their reports listed experimental cracking units. These units in most instances apparently were failures from the standpoint of commercial operation as they were not listed in the reports submitted this year.

This accounts for the fact that the total number of refineries with cracking processes did not increase. The great increase in cracking facilities came at the refineries which already had one or more units in operation. A check on the new units of the Cross, Dubbs, Jenkins, Holmes-Manley processes will show that in most cases they were installed at refineries which have been operating cracking equipment for at least one year. This is one more phase of the trend toward concentration previously explained.

Since changes in cracking rather than crude capacity has become the outstanding development in refinery practices The Oil and Gas Journal is completing a nationwide survey which will give the rated cracking capacity by plants. This report will be published in the near future.

TRAFFIC MEN FAVOR STANDARD CAR GAUGING

(Contined from Page 76)

form form specifications for computing car capacities.

The bureau itself has three or four different methods on record so the American Petroleum Institute committee will be asked to study the problem and work out the most accurate system and urge the Bureau of Standards to adopt it as official.

It was the general opinion of those present that the water gauge was the most accurate, but it was pointed out that tests from this method varied, due to temperatures and other conditions, and that standards even on this method would have to be worked out. Tank car company representatives present explained that the water gauge was the method used by their companies in measuring capacities.

The use of meters was advocated by some but it was shown that even meters were inaccurate many times for the same reasons that the water gauge tests varied.

As for freight claims on outages, it was unanimously voted to recommend that the Association of Natural Gasoline Manufacturers readopt a resolution passed three years ago on this subject and urge all companies to incorporate its provisions in their natural gasoline contracts.

The resolution, it was poiated out, provided for the same uniform method of settling the claims as was recommended by A. C. Holmes traffic manager of the Empire Refineries, Inc., in his discussion of the subject at the traffic conference.

Mr. Holmes expressed the opinion that these claims should be settled on the basis of the railroad listed capacity of the tank shells and not on the actual amount of gasoline shipped. He showed that in certain seasons of the year, due to temperature loading conditions, more gasoline could be loaded than the listed capacity of the cars. In this case, as the consignee pays freight only on the listed capacity of the car, the seller should not be compelled to settle a freight rate claim if the outages do not cause he shipment to fall below the listed capacity of the car. Also, Mr. Holmes showed, if the seller is able to get only 7,900 gallons in a listed 8,000-gallon car, he should settle freight claims only on the outage which causes shipments to fall below 7,900 gallons.

To obtain a uniform method of arriving at these settlements, the association went on record as favoring this system and as a result a copy of these resolutions will be sent to all companies urging them to put this system in to operation.

REGISTRATION

(Continued from Page 148)

J. C. Payne, Tidal Refining Co., Tulsa.
John A. Kane, Tidal Refining Co., Glenpool.
R. L. Barr, Tidal Refining Co., Glenpool.
R. M. Cline, Tidal Refining Co., Tulsa.
A. F. Wood, Chestnut & Smith Corp., Tulsa.
H. D. Lyons, Penna. Tank Line, Tulsa.
J. S. LeGate, Chelsea.
A. H. Stafford, Chelsea.
E. K. Holbert, Tidal Refining Co., Chelsea.
C. J. Frazier, Tidal Refining Co., Chelsea.
F. W. Kerchlin, Atlantic Oil Prod. Co., Tulsa.
Edward P. Fritz, Atlantic Oil Prod. Co., Tulsa.
G. C. DeVugt, Roxana Petroleum Corp., St. Louis, Mo.
W. R. Barrett, Phillips Petroleum Co., Bartlesville.
L. W. Bourne, Fisher Governor Co., Marshalltown, Iowa.
N. F. Walters, Smith Separator Co., Tulsa.
O. C. Meadows, Tidal Companies, Tulsa.
C. E. Nelson, Stebbins Oil & Gasoline Co., Tulsa.
H. E. Rouseback, Naylor Fitzhe & Rooschach, Tulsa.
P. W. Fitzkee, Naylor Fitzhe & Rooschach, Tulsa.
Charles Koons, Chestnut & Smith Corp., Tulsa.
C. S. A. Geppelt, Skelly Oil Co., Tulsa.
A. H. Meinnet, Skelly Oil Co., Tulsa.
Clarence A. Johnson, Skelly Oil Co., Wynona
W. F. Parker, Victor Gasoline Co.
Paul S. Reed.
D. G. Miller, Oil State Gasoline Co., Jenks.
A. E. Hurley, Tulsa.
C. E. Turley, Tulsa.
J. F. Carter, Jr., Refiners & Natural Gasoline Manufacturers, Tulsa.
D. W. Harris, Empire Gasoline Co., Bartlesville.
W. H. Collins, 2401 Thirty-seventh St., Washington, D. C.
M. H. Nolan, Producers & Refiners Corp., Tulsa.
George A. Kroelein, Gilliland Oil Co., Tulsa.
O. F. Cozier, National Petroleum News, Tulsa.
Kenneth B. Ris, Griscom-Russell Co., New York, N. Y.
A. C. Taylor, Texas Pacific Coal & Oil Co., Fort Worth, Tex.
J. A. Edwards, Marland Refining Co., Ponca City.
R. I. Short, Prairie Oil & Gas Co., Tulsa.
E. R. Lederer, Texas Pacific Coal & Oil Co., Fort Worth, Tex.
W. F. Fulton, Palmer Corp., Shreveport, La.
J. L. Gilbert, Palmer Corp., Shreveport, La.
W. A. Schluster, Refinery Supply Co., Tulsa.
J. H. Stewart, Atlantic Oil Producing Co., Tulsa.
W. B. Duckworth, Gypsy Oil Co., Tulsa.
I. L. Yetnay, Tidal Oil Co., Glen Pool.
R. B. Tansel, Petroleum Oils Corp., Tulsa.
Paul Ryan, Chestnut & Smith Corp., Tulsa.
G. C. Simpson, Chestnut & Smith Corp., Sapulpa.
M. E. Farnan, Prairie Pipe Line Co., Tulsa.
H. L. Armstrong, Skelly Oil Co., Tulsa.
R. D. Risser, Roxana Petroleum Corp., Tulsa.
T. T. Hydgins, The C. & G. Cooper Co., Tulsa.
S. B. Maroney, Tidal Oil Co., Tulsa.
H. H. McKnight, Tidal Oil Co., Tulsa.
E. H. Triphaus, Taylor Instrument Co., Tulsa.
G. E. Wynn, Mid-Continent Petroleum Corp., Tulsa.
G. V. Candler, National Supply Co., Tulsa.
B. J. Arbon, Southland Gasoline Co., Tulsa.
L. P. Clarke, Phillips Petroleum Co., Bartlesville.
S. F. Maroney, Carter Oil Co., Tulsa.
R. K. McConnell, Phillips Petroleum Co., Wewoka.
R. E. Young, Romarti Gasoline Co., DeNoya.
C. L. Broadaway, Phillips Petroleum Co., DeNoya.
C. S. Fische, Empire Gasoline Co., Caney, Kans.
George A. Bantha, Transcontinental Oil Co., Bristow.
C. A. Willis, Empire Refineries, Inc., Tulsa.
R. D. Webb, Carbide & Carbon Chemical Corp., Tulsa.
H. W. Camp, Empire Refineries, Inc., Tulsa.
A. B. Sturgis, Skelly Oil Co., Davenport.
J. H. Welch, Tulsa.
Emil Gippelt, Watchorn Oil & Gas Co., Morrison.
C. D. Fleetwood, Noble Oil & Gas Co., Tulsa.
M. A. Henley, Westcott & Greis, Tulsa.
W. W. Grimm, Tidal Refining Co., Tulsa.
W. F. Collum, Tidal Refining Co., Tulsa.
W. P. Jacobi, Wadhams Oil Co., Tulsa.
H. V. Fleming, Roxana Petroleum Corp., Tulsa.
R. L. Morris, Tidal Refining Co., Tulsa.
R. S. Smith, Roxana Petroleum Corp., Tulsa.
B. J. Manley, Page Gasoline Co., Tulsa.
J. W. King, Sand Springs Home, Inc., Gas Department, Sand Springs.
A. S. Hoover, Signal Gasoline Co., Tulsa.
J. A. Campbell, Lomite Gasoline Co., Long Beach, Calif.
E. G. Johnson, Eclipse Paint Co., Tulsa.
F. M. Crow, Eclipse Paint Co., Tulsa.
Alexander B. Morris, Chestnut and Smith, Tulsa.
J. C. Chatfield, National Petroleum News, Tulsa.
H. K. Ervin, Phillips Pet. Co., Bartlesville.
L. VanEighan, New Orleans Refining Co., New Orleans, La.
George P. Burns, Phillips Petroleum Co., Bartlesville.
F. L. Chase, Lane Stan Gas Co., Dallas, Tex.
C. W. Zimmerman, Tidal Companies, Tulsa.
W. R. Lentz, Chestnut & Smith Corp., Tulsa.
J. B. Simoer, The Bruce MacBeth Engine Co., Tulsa.
Grady Tripiett, The Refiner & National Gasoline Manufacturers, Tulsa.
T. T. Lockwood, Independent, Tulsa.
O. H. Schoenwalt, Wentz Oil Corp., Ponca City.
George L. Ratcliffe, General Petroleum Corp., Los Angeles, Calif.
F. S. Thompson, Standard Tank Car Co., Tulsa.
L. W. Ray, Romarti Gasoline Co., De Noya.
J. R. Jarvis, Lone Star Gas Co., Dallas, Tex.
P. C. Coffin, Lone Star Gas Co., Petrolia, Tex.

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OPERATIONS IN MARACAIBO BASIN; VENEZUELA MAY BE FIFTH PRODUCER

By Campbell M. Hunter*
O. B. E., M. A., A. M. Inst. C. E., F. R. G. S., F. G. S. (Member)

The Maracaibo Basin is a horseshoe shaped area, bounded on the west, south and east by mountain ranges, which are offshoots of the main Andean system, and on the north by the Gulf of Venezuela or Maracaibo. Within this area are situated the State of Zulia and parts of the States of Merida, Tachira and Trujillo. Geologically, the State of Falcon also falls within the Maracaibo Basin, though topographically it lies outside to the eastward, between the sea and the mountains which flank Lake Maracaibo on the east. Roughly, the area embraced by the Maracaibo Basin is about 25,000 square miles, or 33,000 square miles if the State of Falcon is included.

Geological

The Maracaibo Basin corresponds with a vast geosyncline, the center of which is occupied by Lake Maracaibo. The mountain ranges surrounding the area on the west, south and east are composed of igneous and metamorphic rocks, while the upturned edges of the formations flanking these mountains belong to Cretaceous and Tertiary ages. Around the periphery exposures of Miocene beds abound, their outcrop of about 400 miles around the basin being marked by numerous oil and gas seepages. Several of these are of great extent, notably that at Mene Grande, which forms a hill rising about 100 feet above the level of the plain and covering an area of 600 acres.

The stratigraphy of the Maracaibo Basin presents many features of interest, to appreciate which it is necessary to consider the general tectonic stresses to which the area has been submitted. A study of the trend of the different structures within the area shows that these have been caused by at least two sets of earth movements—one of which was responsible for the original Andean system, and which in this part of Venezuela has caused the main mountain ranges to run roughly northeast-southwest; while the second set of forces appear to have been exerted from the northward. Where these latter have superimposed the Andean movement they have resulted either in extensive cross-faulting or in the bending round of the folds until ultimately they assume an east and west direction.

The structures to the west of the lake, in the districts of Mara, Maracaibo, Perija and Colon, are disposed in a general north-northeast and south-southwest direction. South of the lake, and north of the Merida range of mountains, the structures lie parallel with the mountain range, which there runs northeast-southwest. Eastward of the lake, in the districts of Trujillo and Sucre, and especially in the district of Bolivar, the structures begin to show the influence of the northern or "Caribbean" tectonic system. After being faulted and bent to the westward, the great Mene Grande-Curacao anticline abruptly veers off to the northeastward, after which it assumes an increasingly easterly direction. One of the interesting features of this Mene Grande-Curacao anticline is the development of spurs or lobes at right angles to its axis, which were brought about by the southward pressure exerted by the "Caribbean" thrust forces. It is on these lateral structures at Ambrosio and La Rosa that the large wells struck by Venezuelan Oil Concessions, Ltd., Lago Oil & Transport Corp. and Venezuelan Gulf Oil Co. are situated.

While the conditions attending the deposition of the Tertiary and Cretaceous beds within the Maracaibo Basin would appear to have been ideal, and to have been prolonged without interruption over a considerable period of time, as indicated by the great thickness of the beds, similar conditions would appear to have been present during the period of their compression into the present structures. Thus, one of the characteristics of all the structures within the Maracaibo Basin is their great lineal development, coupled with, for the most part, their gentle angle of dip. Owing to massive Quaternary deposits in the district of Perija, west of the lake, it has been impossible as yet to trace the known structures any great distance. But there is strong evidence that these will be found to extend for many miles. Southwest of the lake, the anticlines known as Rio de Oro and La Tarra have each been traced for upwards of 50 miles. Along the Rio Poco anticline, which parallels the Merida range in the south, oil seepages are reported over a distance of about 100 miles. Eastward of the lake, the Mene Grande-Curacao anticline can be traced for about 60 miles, along which numerous seepages are found. Again, in the State of Falcon, although insufficient geological work has as yet been done to determine the length of the various anticlines, it is probable these will be found to link up into several long parallel folds.

Generally, the peripheral or parallel nature of these structures to the mountain ranges surrounding the lake is highly suggestive that the several folds found westward of the central area of the basin will in time be found to have their equivalent expression in the eastern portion of the area. Much valuable light should be thrown on this interesting point when the survey of the lake bottom is completed, as, already, soundings taken near the shore have been found singularly helpful in deducing underground structures, both in the La Rosa and Ambrosio areas.

Major Oil Fields

In view of its having been the first to be systematically developed, the Mene Grande Field deserves first mention, though, as regards output, the La Rosa Field is now of greater importance. The Mene Grande Field, which is operated by the Caribbean Petroleum Co., a Royal Dutch-Shell subsidiary, is situated some 12 miles inland from the lake, with which it is connected by means of a narrow gauge railway. The anticline on which this field is situated extends southward from the great asphalt mountain at Mene Grande, and consistently good results have been obtained along its entire extent. The approximate distance between the more northerly and southerly wells is 3 miles, while its present east and west width is 2 miles. No dry holes have as yet been drilled within this area, and large producing wells continue to be struck both to the south and eastward. A striking feature of this field is the remarkable vertical depth of 1,800 feet, down which the oil producing series has been followed, without as yet any indication of edge water. Up to the end of 1925, some 18,000,000 bbls. of oil had been shipped, equivalent to an average of nearly 315,000 bbls. per well. Of the 60 odd wells drilled to date, four had yielded, to the close of 1925, 398,000 tons, 249,000 tons, 364,000 tons and 108,000 tons, respectively; the last well being the southernmost on the property, and the production given is that for six months only, at the end of which it was still flowing at the rate of over 100 tons a day.

The wells range in depth between 1,000 and 2,700 feet, and until recently were drilled by cable tools with mud circulation. The rotary system is now displacing the cable tools, and is giving encouraging results.

The oil in the Mene Grande Field is of an asphaltic nature, with a gravity of 16½ degrees Baume, equivalent to .956 specific gravity. The field is connected by two pipe lines to San Lorenzo, where the company has a refinery, whence the crude and other products are shipped by lake steamer to Curacao and elsewhere.

La Rosa Field

This field is on the east shore of the lake, about 27 miles southeast of the city of Maracaibo. Unlike the southern fields, the climatic conditions at La Rosa

*Before Institute of Petroleum Technologists, London.

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Fig. 761

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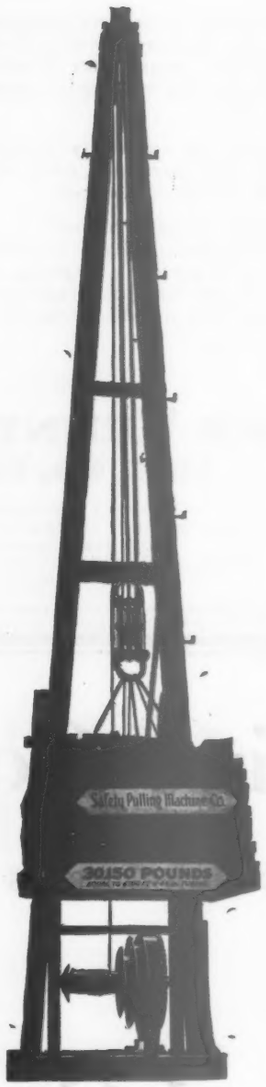

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are good, as it lies just within the semi-arid zone of northern Venezuela. The first well at La Rosa was started in 1915, but no development of any importance took place until 1922, when Barroso No. 2 was brought in at a depth of 1,495 feet, and flowed a million barrels in nine days. The success attaching to this well furnishes another example of the fortune which may attend oil prospectors, since it had been commenced eight years previously and abandoned at a depth of 900 feet. It was only in 1922 that drilling operations were resumed, apparently with a view to utlizing the derrick, which had been left standing when the well was shut down. With the completion of this remarkable gusher, which undoubtedly constitutes the turning point in the oil industry of Venezuela, a tremendous impetus was given to oil activity in the neighborhood. Thus, the Lago Petroleum Corp. at once started drilling on its Maritime concession in the lake, opposite the little village of La Rosa. The success which attended this well is now historic, and has resulted in about 125 wells having been drilled to date in its immediate vicinity, the resultant production from which, to the close of 1925, amounted to 12,000,000 bbls., exclusive of that of No. 2 Barroso.

As previously stated, underground structural contours show this field to be situated on a lobe or spur structure at right angles to the main fold, whose axis lies about 20 kilometers inland. Initially, wells, after passing through the Tar sands, were brought into production in the so-called La Rosa sand. It was not until the middle of 1925 that a deeper sand, called the Santa Barbara, was discovered. The first well to encounter the new horizon was R. 28, of the Venezuelan Oil Concessions, Ltd. Unfortunately, the well came in out of control, with the result that the gas became ignited from a boiler house some hundreds of yards distant. Several derricks were destroyed, and drilling operations were greatly retarded. Since then, a sand intermediate between the La Rosa and Santa Barbara sands has been discovered, though up to the present it has not been found possible to determine its richness.

The deepest producing wells so far drilled in the La Rosa district only amount to 2,600 feet, and as there is no sign yet of edge water having been encountered, it would appear that the field is capable of considerable extension into the lake as well as to the north and southward.

Up to the present the field has been proven over a north and south distance of 4 miles, while its greatest east and west development amounts to 1½ miles. Within this area no dry holes have as yet been drilled. The wells come in at anything from a few hundred to as much as 15,000 bbls. per day, while gas pressures of over 800 bbls. have been recorded. The handling of these big wells calls for considerable skill, since the oil is associated with from 3 to 5 per cent of fine sand. So far, gas separators have not been found very successful, owing to the large volume of sand brought up with the oil, and the wells are therefore allowed to flow into open pits, tubular gas separators being introduced at the end of the flow lines.

La Rosa Field presents a scene of more than usual interest, since most of the wells are situated in the lake. Narrow board walks connect the wells with each other and to the mainland, while the boiler houses are built on piles. From the point of view of transport, wells in the lake enjoy distinct advantages over those on land, especially during the rainy season, but, as drilling proceeds further out into the lake, other problems, such as separating the sand from the oil, will call for careful technical study.

Ambrosio Field

The discovery of the Ambrosio Field reflects highest credit on the geological staff of the Lago Petroleum Corp. The first well in this area was located about 1,300 meters from the shore and at 1,380 feet it came in under tremendous gas pressure, after penetrating the Tar sands for a few feet. So far six wells have been brought in within this area, all of which confirm the great richness of the La Rosa sand, below which, so far, no well has been drilled. The development of the Ambrosio Field presents many interesting problems, since the minimum depth of the lake at this point is 12 feet.

El Mene

This field is situated some 33 miles inland to the eastward of the village of Alta Gracia, on the east shore of the lake, nearly opposite to the city of Maracaibo. One of the greatest difficulties that has to be overcome in the development of this field was that of transport, which during more than half the year was a matter of almost superhuman effort, owing to the swampy nature of the ground. Shortly a narrow gauge track will be completed to the field, after which it should be possible to rapidly extend its development. The topography and scenery at El Mene represents a distinct contrast both to that at La Rosa and Mene Grande, since the country is hilly and broken, and being near the arid zone the vegetation is not so rank as it is further south.

Drilling initially commenced on this field close to the large oil seepage, and it would appear that the first interpretation of the structure was that the anticline trended southward from that point. At any rate, the early wells were mostly congregated southward of the seepage, and it was not until No. 15 was drilled a little to the westward that the first strike of importance was recorded.

Cable tools are exclusively used on this field. Drilling is easy and the wells average from 800 to 1,200 feet in depth, the oil series being about 200 feet thick. The quality of the oil is remarkable, having a specific gravity at 60 degrees Fahrenheit of .850. On distillation by steam it yields about 35 per cent of petrol and 38 per cent of kerosene.

In addition the crude is said to contain about 5 per cent of aromatic bodies, which distil over in the petrol fraction.

The production of El Mene Field to the end of 1925 amounted to approximately 4,400,000 bbls., with about 50 wells in production.

An interesting geological feature of this field is its determination on the north by a very well-defined east-west fault. This fault may possibly be the extension of the great fault which passes through the Island of Toas, at the mouth of the narrows leading into Lake Maracaibo.

La Concepcion

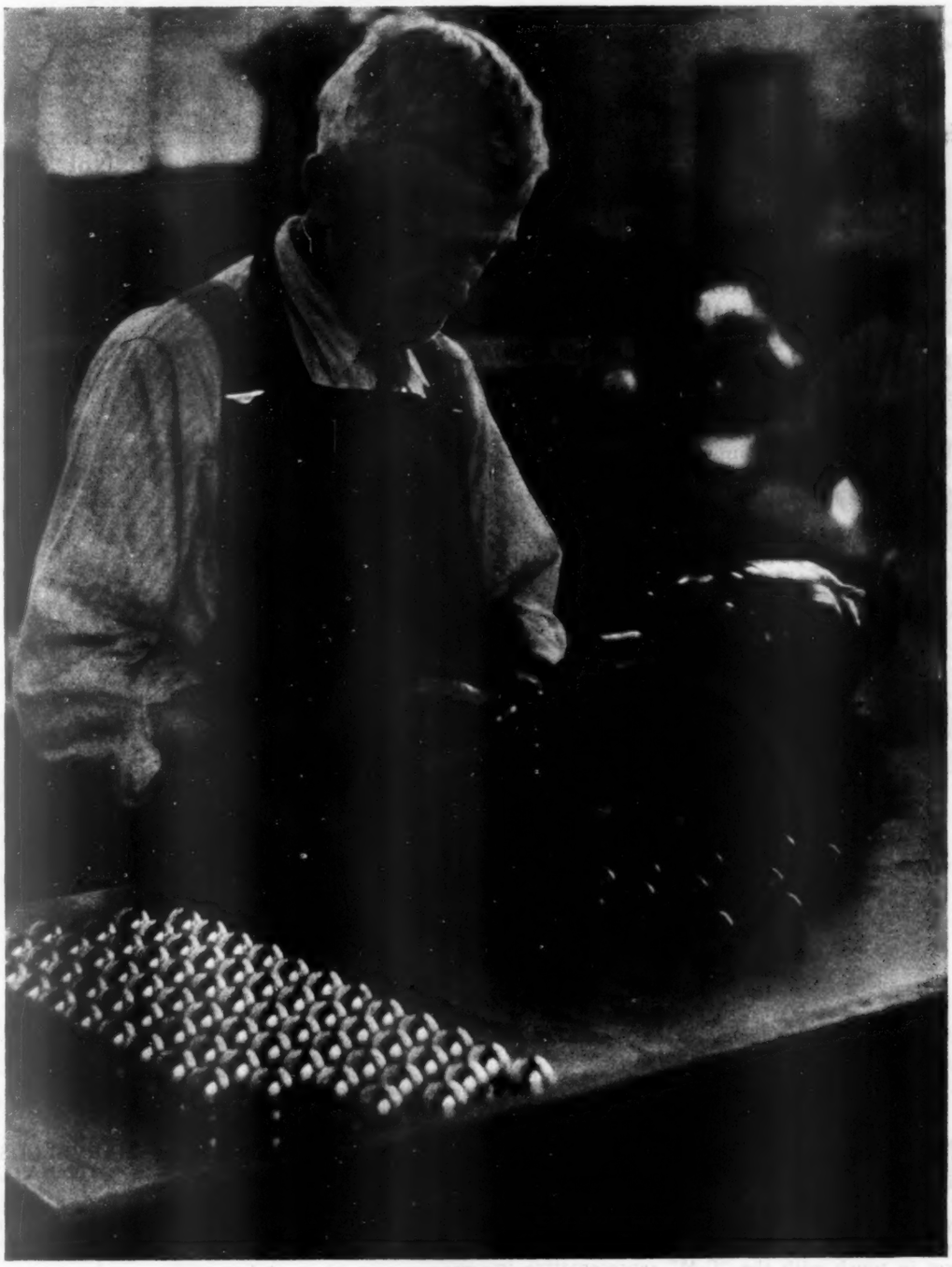
The discovery of this field redounds highly to the credit of the geological department of Venezuelan Oil Concessions, Ltd., as there were no surface indications of oil or other rock exposures. Attention was first drawn to the area through its lying topographically at a slightly higher level than the surrounding country, after which numberless pits were dug to a considerable depth. From these, valuable geological information was derived which led to the determination of the structure. The first well drilled more than confirmed the geological forecasts, and the subsequent drilling has extended the field considerably. The oil is of a high grade character, not unlike that at El Mene.

Cable tools are used on the field, and the production is pumped through a 17-mile 6-inch pipe line to the terminal at Punta Piedras, some few miles south of the town of Maracaibo. As indicating the richness of this field, a well recently completed, No. C. 27, came in with a production of 235 tons in the first 35 hours, through a 1-inch flow plug, while No. C. 25 produced 75 tons in seven hours through a 1⅛-inch flow plug.

La Paz

La Paz lies 12 miles to the westward of La Concepcion, or 28 miles from the town of Maracaibo. The field is characterized by extensive asphalt deposits, which indicate the trend of the structure as running north northeast to south southwest. The character of the oil encountered is heavier than that of La Concepcion, though of a slightly better quality than that of the La Rosa Field. Cable tool drilling is resorted to and wells with an initial flow of from 200-400 tons per day are encountered.

This field is situated in the northwest



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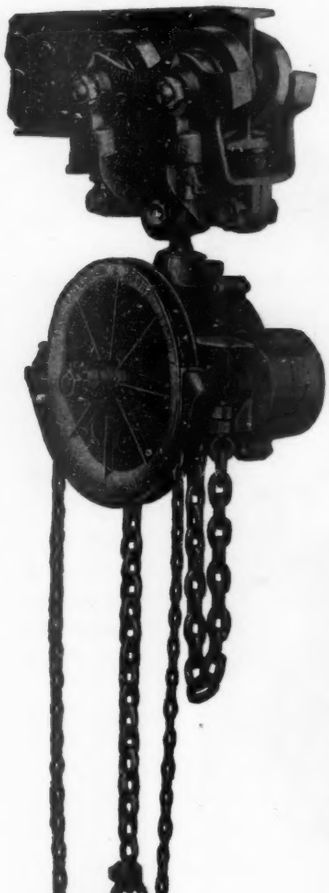

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corner of the district of Perija, about 30 miles W.S.W. of the La Paz oil field. Unfortunately, the first well, on striking oil, was ordered by the courts to be shut down, owing to its location being outside the area of the concession of the operating company. The well is reported to have come in at a depth of approximately 1,227 feet, and the oil was said to have flowed over the top of the derrick with considerable violence. The litigation which followed the completion of the well has now been settled.

Rio De Oro

This lies about 47 miles W.N.W. of the town of Encontrados on the Catatumbo River in the district of Colon. Drilling was first commenced in 1915, the well having furnished a good production at under 1,100 feet, the gravity of the oil being about 27 degrees Baume, specific gravity .892. Several other wells have since been drilled and the geological information collected points to the structure being of great importance and likely to furnish considerable quantities of oil. Like the Tarra anticline, lying some 40 miles to the southeastward, its production will probably have to be pumped to Encontrados, from which point it can be handled in barges down the River Catatumbo.

Tarra Field

Situated 30 miles southwest of Encontrados, this field is of special interest since its structure extends into Colombia. Drilling operations have been carried on during the past 10 years, the wells being located on the northern end of the anticline, where up to the close of 1925 some 11 wells had been drilled. One at least of these is reputed to be good for 2,000 bbls. a day, the gravity of the oil being about 30 degrees Baume, specific gravity .875. Results so far obtained indicate that the field should furnish a considerable production.

Southern Fields

While several prospecting wells are in the course of drilling on structures lying to the south of Lake Maracaibo, no important results have so far been obtained, probably due to the wells having not as yet been carried to a sufficient depth. Extensive oil seepages occur in this area.

Transportation

Owing to the mouth of Lake Maracaibo being obstructed by two shallow bars, the shallower of the two permitting vessels drawing only 11½ feet to enter, all oil produced within the Maracaibo Basin area has to be handled in shallow draft tankers, which discharge their burden at some convenient spot outside the lake. The most highly developed ocean terminal is that of the Royal Dutch-Shell group in the Island of Curacao, where, in addition to extensive storage, a large refinery and cracking plant has been erected. The round trip from La Rosa to Curacao and back occupies four days.

The San Nicolas ocean terminal of the Lago Oil & Transport Corp. in the Island of Aruba should shortly be completed. At present the lake tankers of that company discharge their cargo into one of two "mother" or "depot" ships moored off the Island of Aruba, alongside which ocean-going tankers receive their cargo. This arrangement has worked remarkably smoothly since it was first initiated, nearly 800,000 tons having been handled in this way. The round trip from La Rosa to the Island of Aruba takes three days.

Several companies, including the Venezuelan Gulf Oil Co., have acquired ocean frontage on the west coast of the Peninsula of Paraguana.

Venezuelan Production

The remarkable progress in the development of the oil industry of Venezuela is reflected in the following statement, which shows that within the comparative brief space of six years, an annual production of close to 20,000,000 bbls. has been developed.

At the present rate, there can be little doubt that the production of the Maracaibo Basin will substantially exceed 30,000,000 bbls. in 1926, and, therefore, place Venezuela as the fifth if not fourth largest producer in the world.

Production of Petroleum From the Maracaibo Basin

(Barrels)

Year	Caribbean Petroleum Company	British Controlled Oilfields Limited	Venezuela Oil Concession Co., Ltd.	Venezuela Gulf Oil Co., Ltd.	Lago Oil and Transport Co.	Total
1920	452,002	.....	.....	.....	.....	452,002
1921	1,429,543	.....	.....	.....	.....	1,429,543
1922	2,187,139	3,883	588	.....	.....	2,191,610
1923	3,524,377	.....	479	.....	.....	3,525,356
1924	4,776,540	1,013,480	2,637,523	.....	414,871	8,239,414
1925	*6,250,000	*3,375,000	*2,300,000	*1,750,000	*4,460,000	*18,135,000
	18,620,131	4,391,363	5,938,590	1,750,000	4,874,871	35,572,925

*Productions for 1925 are approximate.

To Expedite Trade, Not to Restrain it, Government's Duty

Addressing the Los Angeles City Club Secretary of the Interior Hubert Work, chairman of the Federal Oil Conservation Board, said:

"These United States constitute a young nation in adolescence, but already a world power of first rank in brain units, man power, finance and natural resources. This nation compels big business and, fortunately, we have developed big business men. And today, with our steady march of national progress, it would seem that the warning 'in restraint of trade' has given way to an urge to 'expedite trade.'

"I am opposed to Government ownership or operation of any public activity that is within the compass of private citizens. For five years I have been directing Government services under a mandate to 'central authority and decentralize responsibility.'

"The citizens' right of appeal is their due against unfair advantage by monopolistic utilities, but no local authority can compel services from a company not included in their charter or for which they are not paid to perform. States' rights for civil protection and local industrial development is fundamentally sound in theory and an essential to a proper functioning of the Federal Government. Yet, changing conditions have waged an economic, social, industrial and governmental revolution in this country in the past ten years. The World War broke down precedents and practices and, because of our readjustments, we would now seem to appear as a new nation. Larger corporations and mergers are a necessity because of these changed conditions and men's views, too, must change to meet them. But corporations are not geared to operate unrelated businesses or to bring about interstate and international comity, and mergers have been compelled which contemplate consolidations of related business to cheapen their service. Many, perhaps, are not pleased with the change, but it is here, and a new epoch in the nation's history is being written. If men's sanity today is to be measured by their ability to adapt themselves to their environment, then that of the American people must be of the highest order in history."

MARVELOUS GROWTH OF NATURAL GASOLINE

(Continued from Page 88)

1,200,000,000,000 feet of gas was treated by something over 1,000 gasoline plants last year.

Some idea of how much gas this is can be had from the fact that all of the natural gas companies in the United States last year delivered to their millions of customers almost exactly the same amount of "dry" gas as the natural gasoline plants used of "wet" gas—and that the value of the dry gas, at the point of production, was almost exactly the same as the value of the natural gasoline, at the plants.

VALUE OF WELLS IS CONSIDERED IN FLUID DELIVERY FROM RESERVOIRS

By Stanley C. Herold
Petroleum Geologist, Stanford University, Calif.

The phenomena which we ascribe to Capillary Control were hitherto not detected in laboratory or industrial apparatus consisting of tanks or tubes, which are filled with moist porous material, and from which gas alone, or liquid with gas, is discharged through an orifice. The reasons appear to be quite logical. We were undoubtedly interested more in qualitative considerations of capillary attraction than in quantitative measurements of a capillary repulsion exemplified by Jamin's experiments with fine tubes and porous cells. We have not failed to recognize capillary action, for we have been certain to perform our tests under conditions of pressures sufficiently intense to overpower such action. Low pressures gave us readings which were not in accord with expectation; therefore, if we took such readings, we were inclined to discredit and ignore them. We felt that vitating factors had become too prominent for reliable operation. Small errors appeared magnified, when reckoned in percentages of the small pressure or volume values involved. We can say now, however, that the readings were unreliable only for the reason that we failed to interpret them properly. A new and unexpected set of conditions came into existence as soon as the pressure had declined to a definite critical point for the apparatus.

Nor were these phenomena hitherto detected in those artesian water wells, plentiful in number, from which water and gas flowed in accordance with the very laws we now study. The pressures of the wells were often great, but we had no reason for measuring them. Water was delivered to us by gallons per minute, or per hour; we had no occasion to plot curves between the rate of production and time, in order to have convenient comparative data respecting past, present, and estimated future delivery. How could we have determined facts which we did not expect in these wells?

We all admit that the market value of a barrel of oil, and that of 1,000 cubic feet of gas, has induced us to establish our present system of record keeping and curve plotting. From the appearance of these records and curves we can clearly distinguish the effects of Capillary Control.

Values of Wells

607. Aside from their location, and the quality of their product, upon what basis should we judge the value of individual wells or groups of wells? The function of volume should be given first consideration. We should therefore look for

(a) The maximum ordinate on the volume-time curve, or

(b) The maximum area subtended by the velocity-time curve.

These show the total cumulative production to be expected from the wells.

Of next consideration is the function of velocity. We should look for

(c) The maximum ordinate on the velocity-time curve, or

(d) The maximum area subtended by the acceleration-time curve.

These show the rate of income from the wells. For (d) in wells of Capillary Control we may use the pressure-time curve. (Article 606).

Possibly this scheme does not meet with universal accord, inasmuch as we frequently learn of purchases and sales being based primarily, and sometimes solely, upon the ordinate of the velocity-time curve. Rate of production receives attention to the partial or total exclusion of the possible total cumulative production.

Energy-Time Relations

606. The general equation for the energy possessed by a fluid in a reservoir, in terms of its pressure and volume, is

$$E=K\,PVo \quad \ldots\ldots\ldots\ldots (1)$$

The energy at any instant during the life of the reservoir depends only upon the pressure and the volume present at the instant, and does not depend upon the control of the reservoir. The equation states that the potential energy is equal to the product of a constant K, the potential pressure, and the potential volume. K is dependent upon the units employed in measuring the three functions.

By Articles 560, 577, 578 and 579, we have

$$P=K\,T^3, \quad \ldots\ldots\ldots\ldots (2)$$

and by Article 589,

$$Vo=K\,T^4 \quad \ldots\ldots\ldots\ldots (3)$$

By substituting (2) and (3) into (1), combining all constants into one value K, we have,

$$E=K\,T^7 \quad \ldots\ldots\ldots\ldots (4)$$

The potential energy possessed by the fluid within a reservoir of this control varies as the sixth power of time remaining.

Our main interest in equation (4) is in connection with combination reservoirs. When a Capillary Control reservoir produces both liquid and gas, the cumulative gas volume is dependent upon energy-time relations. (Article 592).

The relative curve was shown in Figures 586 and 587. The required parameter has the value of

$$K=10^{7-12}=-^{10};$$

therefore the relative equation is

$$E=1/10^{10}\,T^7.$$

The potential energy in per cent is equal to 1 divided by 10,000,000,000, multiplied by the sixth power of per cent time remaining. (When T=100, T raised to the sixth power is equal to a trillion, or a million million, and this quantity, divided by 10,000,000,000, gives the required condition that E=100.)

Power-Time Relations

609. The general equation for power, the rate at which a reservoir gives up its energy, in terms of its pressure and velocity is

$$Po=K\,PVe \quad \ldots\ldots\ldots\ldots (1)$$

In a manner similar to energy the power depends only upon the pressure and velocity at any given instant during the life of the reservoir. It does not depend upon the control of the reservoir.

As above, we have

$$P=K\,T^3, \quad \ldots\ldots\ldots\ldots (2)$$

and by Article 593,

$$Ve=K\,T^3. \quad \ldots\ldots\ldots\ldots (3)$$

By substituting (2) and (3) into (1) combining all constants into one value K we have

$$Po=K\,T^6. \quad \ldots\ldots\ldots\ldots (4)$$

The potential power of a reservoir in this control varies as the fifth power of time remaining.

This formula may also be derived from equation (4) of the preceding article by differentiation. This method indicates to us the relationship existing between areas under the power-time curve and ordinates of the energy-time curve. The entire area under this fifth-power parabola is found to be one-sixth of the rectangle enclosing it. Therefore, the entire energy possessed by fluid in a reservoir, at any instant during its life, is equal to one-sixth of the power being delivered by it at the instant, multiplied by the time required to empty it.

The power-time relative curve was also included in the charts of Figures 586 and 587. The required parameter has the value

$$K=10^{5-10}=10^{-5};$$

therefore the relative equation is

$$Po=1/10^5\,T^5.$$

The potential power in per cent is equal to one divided by one hundred million, multiplied by the fifth power of per cent time remaining.

Power-time relations are also of interest in connection with combination reservoirs.

Summary on the Laws of Delivery

610. We have completed a survey of all fundamental primary functions of delivery from reservoirs of Capillary Control. As in our treatment of Volumetric Control, we began with pressure-time and pressure-volume relations, and from these we determined the remaining formulas.

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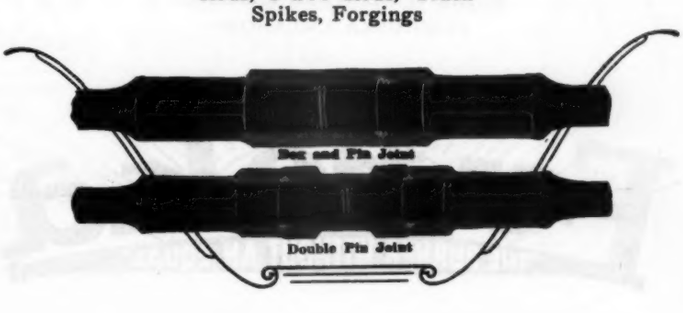

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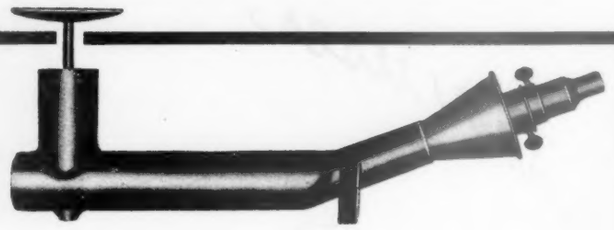

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In Table 610 the formulas are grouped in convenient form for comparison with Tables 272 and 475, corresponding to Hyradulic and Volumetric Controls, respectively.

Table 610

Equation No.	Relation	Delivery Formula	Mathematical Formula
1.	Pressure-Time	$P = KT^2$	$y = px^2$
2.	Volume-Time	$Vo = KT^4$	$y = px^4$
3.	Velocity-Time	$Ve = KT^3$	$y = px^3$
4.	Accelera.-Time	$Ac = KT^2$	$y = px^2$
5.	Energy-Time	$E = KT^5$	$y = px^5$
6.	Power-Time	$Po = KT^3$	$y = px^4$

The first four equations pertain to

(a) Gas from reservoirs producing gas only,

(b) Liquid from reservoirs producing both gas and liquid.

The remaining two equations pertain to

(c) The entire reservoir, but specifically to

(d) Gas from reservoirs producing both gas and liquid.

The relative curves may be stretched vertically and horizontally to suit any particular reservoir of this control. The amount of stretching required in either direction depends upon the values possessed by the reservoir at any instant of interest to us during the life of the reservoir. Curves obtained in this manner would, of course, represent ideal performance.

All Curves Interrelated

611. The remarks concerning the geometrical aspects of decline, given in Article 443, are equally relevant in both finite controls. We need not repeat the principles at this time.

For reservoirs of Capillary Control we have seen that the exponent for T in the formula

for acceleration and pressure is 2
for velocity is 3
for volume is 4
for power is 5
for energy is .....6.

Each formula is obtainable from the one preceding by the process of integration, or from the following by the process of differentiation. The area subtended by each curve bears the relation to the ordinate of the one following as stated in Article 605. We may say that

(a) The area under the acceleration and pressure curves represents units of velocity. (Articles 605 and 606).

(b) The area under the velocity curve represents units of volume. (Article 597).

(c) The area under the volume curve represents units of power, and

(d) The area under the power curve represents units of energy.

All fundamental primary function curves are thus related. In Article 444 we gave a similar scheme for areas subtended by curves in Volumetric Control. One important change can be noted; namely, pressure in the former control is removed from item (c) and is now placed in item (a). An area which represents units of power in the one case represents units of velocity in the other.

As these curves are related, so must their constants K be related. For a particular reservoir we need only determine K in the equations for pressure-time and pressure-volume, by observations upon the behavior and status of the reservoir, and the other values of K will follow by the usual consequences of mathematical calculation. We might thus obviate the necessity of determining the specific values of constants for all equations other than the original ones by actual test. Mechanical and hydraulic engineers have devoted considerable time to the determination of constants relative to the motion of fluids. Some of the work appears to be a duplication of effort, inasmuch as related constants could have been determined by computation. Of course, the method of computation requires the use of the correct analytical equation. An equation determined empirically, although probably quite sufficient for many engineering calculations, within the range required in practice, will not be suitable for the present purpose.

Gas Produced With Liquid

612. In Volumetric Control we considered the equations which pertain to the gas being produced from a combination reservoir by setting up an imaginary apparatus as shown in Figure 452 and studying its behavior. We may proceed on a similar basis in the present control. Our apparatus would consist of either a single capillary tube or a bundle of such tubes arranged radially from a central chamber. The quantity of liquid present within the apparatus must be greater than that required to fill the channels connecting the "dilations," or pore spaces. (Article 592). The tubes should preferably be of the type selected in Article 575.

Having presumably determined the percentages of gas which correspond to the pressures S, A, RS, C, and RC, as directed in Article 455, we may proceed at once with the derivation of equations corresponding to those of Articles 456 and 459. We likewise may construct the necessary curves which correspond to Figures 454, 457, and 460. Now we have an opportunity of abbreviating our story somewhat by recognizing the fact that a full discussion in the present case would exactly duplicate the words of Articles 455 to 459 inclusive. Suppose we merely tabulate our new equations, giving them numbers which agree with their correspondents in the cited articles. The curves in the figures may be imagined altered to suit. We would not infer by this method of presentation that the study of gas lacks anything of importance. We believe quite otherwise. There recently appeared an article in The Oil and Gas Journal on the general subject of research in petroleum. One of the proposed subjects was the study of "oil reservoirs and the relationship of the gas, oil and water in them." We believe that these equations, together with the ones pertaining to Volumetric Control, state faithfully the fundamental relations between the gas and liquid produced in combination from our wells. Possibly for practical purposes they may be simplified somewhat; but we venture to say that they cannot be simplified for use in theoretical analyses.

New Equations

613. In Article 456 substitute the following equations:

$$Ve = K_1T^3 \quad (1)$$
$$P = K_2T^2 \quad (2)$$
$$RS = K_2T^2 + (RC) \quad (3)$$
$$S = K_2T^2 + C \quad (4)$$
$$Gpp = K_2T^2 + C \quad (5)$$
$$Po = K_1K_2T^3 \quad (6)$$
$$Po_2 = K_1(RC)T^3 \quad (7)$$
$$Po_1 = K_1C\,T^3 \quad (8)$$
$$Po'' = K_1K_2T^3 + K_1C\,T^3 \quad (9)$$
$$GVe = K_1K_2T^3 + K_1C\,T^3 \quad (10)$$
$$Po' = K_1K_2T^3 + K_1(RC)\,T^3 \quad (11)$$
$$G'Ve = K_1K_2T^3 + K_1(RC)\,T^3 \quad (12)$$

In Article 459 substitute the following equations:

$$E = \tfrac{1}{15}\,K_1K_2T^5 \quad (13)$$
$$E_2 = \tfrac{1}{4}\,K_1(RC)\,T^4 \quad (14)$$
$$E_1 = \tfrac{1}{4}\,K_1C\,T^4 \quad (15)$$
$$E'' = \tfrac{1}{15}\,K_1K_2T^5 + \tfrac{1}{4}\,K_1C\,T^4 \quad (16)$$
$$GVo = \tfrac{1}{15}\,K_1K_2T^5 + \tfrac{1}{4}K_1C\,T^4 \quad (17)$$
$$E' = \tfrac{1}{15}\,K_1K_2T^5 + \tfrac{1}{4}\,K_1(RC)\,T^4 \quad (18)$$
$$G'Vo = \tfrac{1}{15}\,K_1K_2T^5 + \tfrac{1}{4}K_1(RC)T^4 \quad (19)$$

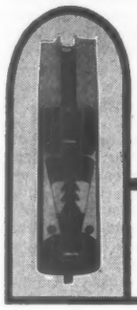
The last equation is the inverted cumulative gas curve for our capillary apparatus, and for our wells of Capillary Control, when both liquid and gas are produced.

Computation for Gas Volume

614. As in Article 461, in view of the dynamic relations between power and gas velocity, and between energy and gas volume, we are able to say that the area under the gas velocity-time curve represents units of gas volume. We may therefore formulate the following rule: The total volume of free gas to be delivered from a combination reservoir of Capillary Control, subsequently to any particular instant during its life, is equal to the life remaining, multiplied by the sum of one-sixth the potential gas velocity at the instant and one-fourth the suppressed gas velocity at the instant. The distinction between these two gas velocities was explained in Article 456, and the manner of making the apportionment of the total gas issuing from the reservoir is evident from the discussion in Article 455.

Auxiliary Laws

615. To the laws of Table 610 may be



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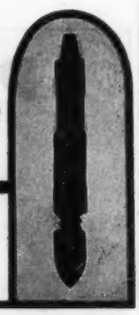

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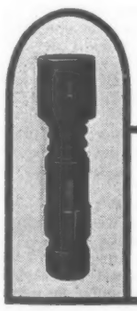

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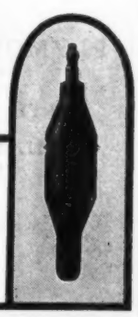

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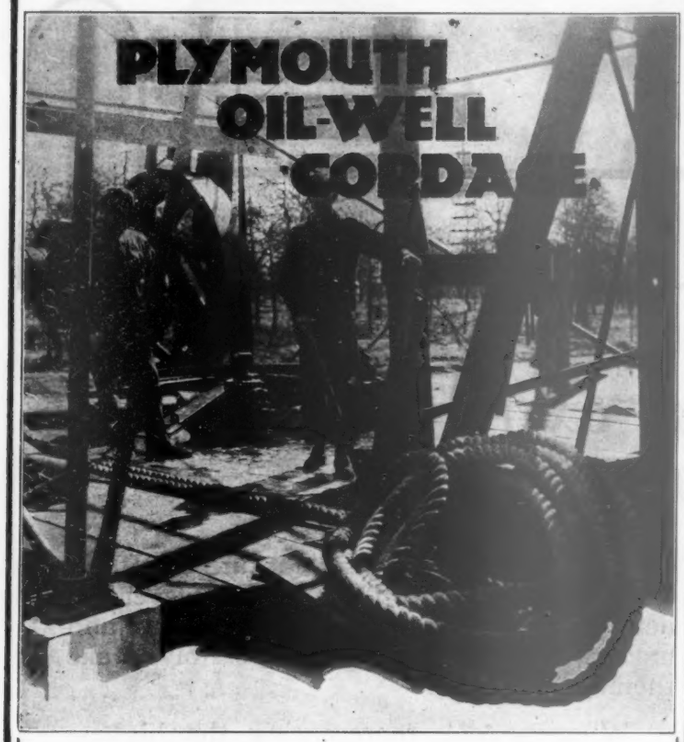

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added the auxiliary laws pertaining to the gas fro mcombination reservoirs. The formulas are taken from Articles 613 and 614. The following table may be compared with Tables 273 and 476, corresponding to Hydraulic and Volumetric Controls, respectively.

Table 615

Equation	Relation	Delivery Formula	Source Equa.
7	Gas volume-time	$Gvo=KT^4+CT^4$	5
8	Pro. gas pro.-time	$Gpp=KT^3+C$	1
9	Gas velocity-time	$Gve=KT^5+CT^5$	6

The composite constants are reduced to the simple K and C. These may be determined by direct test or by computation, using the originally determined constants for the first four equations of Article 613.

Derived Primary Function Relations

616. The formulas for the derived primary function relations are obtained from the equations of Table 610 by algebraically eliminating T between any two of them chosen to form a couplet. As before, there are 15 of these formulas. In constructing curves in accordance with the formulas, either function of a particular couplet may be plotted as abscissas, leaving the other to be plotted as ordinates.

The following table may be compared with Tables 274 and 477.

Table 616

Equation No.	Relation	Delivery Formula	Math. Formula
10	Pressure-Vol.	$P=KVo^{1/2}$	$y=px^{1/2}$
11	Pressure-Vel.	$Ve=KP^{3/2}$	$y=px^{3/2}$
12	Pressure-Accel.	$Ac=KP$	$y=px$
13	Pressure-Energy	$E=KP^3$	$y=px^3$
14	Pressure-Power	$Po=KP^{5/2}$	$y=px^{5/2}$
15	Volume-Veloc.	$Ve=KVo^{3/4}$	$y=px^{3/4}$
16	Volume-Accel.	$Ac=KVo^{1/2}$	$y=px^{1/2}$
17	Volume-Energy	$E=KVo^{3/2}$	$y=px^{3/2}$
18	Volume-Power	$Po=KVo^{5/4}$	$y=px^{5/4}$
19	Velocity-Accel.	$Ac=KVe^{1/2}$	$y=px^{1/2}$
20	Velocity-Energy	$VE=KE^{1/3}$	$y=px^{1/3}$
21	Velocity-Power	$Ve=KPo^{1/5}$	$y=px^{1/5}$
22	Accel.-Energy	$Ac=KE^{1/3}$	$y=px^{1/3}$
23	Accel.-Power	$Ac=KPo^{1/5}$	$y=px^{1/5}$
24	Energy-Power	$E=Kpo^{1/5}$	$y=px^{1/5}$

The interchanging of functions in these equations, and the consequent effect upon the constant K and the curve, was commented upon in Article 477. Equation 11, for example, may be written as

$$P=KVe^{3/2}$$

or as $Ve^3=KP^2$.

We may either construct separate relative curves for these derived relations, determining the proper value of K in the usual manner, or we may cut the curves of Figures 586 and 587 by vertical lines. Such cuts, like the formulas, show values which are independent of the function T. As usual, pressure, volume and energy, are absolutely independent of time, whereas the other functions involve time in their definition. (Article 478.)

Auxiliary Derived Laws

617. We found in Article 479 that the derived primary function laws are not confined to couplets between the fundamental equations. For the present control we may form couplets between the functions in Tables 610 and 615 by substituting the value of T from the first equation into the second. For example, corresponding to the procedure in the cited article, we may determine the relation between the potential pressure and gas velocity. The value of T in equation (1) is

$$T=K\,P^{1/3}.$$

By substituting this into equation (9) we have

$$GVe=K\,P^{5/3}+C\,P^{3/2},$$

the constants being reduced to the simple K and C.

Again, the relation between liquid velocity and gas velocity is determined in the same manner. From equation (3),

$$T=K\,Ve^{1/3}.$$

By substituting this into equation (9) we have

$$GVe=K\,Ve^{5/3}+C\,Ve$$

with the constants reduced.

Fifteen of these equations are likewise possible for the present control. The relative curves would normally have two frames. (Article 479.)

Gas and the Control

618. We have noted that a reservoir in Volumetric Control can produce liquid alone, whereas one in Capillary Control cannot do so. (Article 592). If a well produces oil, water or both, without free gas, we can be sure that its reservoir is not of the latter control.

A well which produces liquid and gas may have a reservoir of either control; likewise one which produces gas only. Is it not possible that, among the great number of wells producing both liquid and gas, we may have some which are on the border line between a true gas well spraying oil and a true oil well producing large amounts of gas? This might be possible in either control. A condition such as this would rest upon a factor which may be termed "the submergence of the orifice." The bottom of the well may be so located in the formation on structure that submergence may be partial. What would a combination rigid tank do if the orifice were only partially submerged? Again, where may the line be drawn between a quantity of liquid sufficient to be held in capillary channels connecting pores and a quantity necessarily occupying a portion of the pore spaces?

Plot the potenial gas velocity-time curve on a parabolic-logarithmic plat. If the resulting straight line has

(a) A slope of one to one, we have a Volumetric Confrol gas well spraying oil.

(b) A slope of three to one, we have either a Volumetric Control oil well with gas liberated from solution, or a Capillary Control gas well spraying oil.

(c) A slope of five to one, we have a Capillary Control oil well with gas liberated from solution.

In case of a slope three to one it will be necessary to plot the pressure-velocity curve for the oil as in Figure 559.

Straight-line Plotting

619. In Tables 610 and 616 we find but one question which may be plotted as a straight line on the Cartesian plat, while all are straight on the logarithmic plat. For the latter the slope of the line is indicated by the exponent of the right-hand member, integers being rewritten in fractional form with a denominator of unity. The discussion of Article 606 rested upon the fact that there is a straight-line relation between pressure and acceleration, as shown by equation (12).

If we make the proper substitutions in the equation, all may be caused to plot as straight lines on the Cartesian plat. For example, write equation (1) as follows:

$$P^{1/3}=K_1\,T,$$

and for the square root of pressure substitute a variable function F'; thus giving

$$F'=K_1\,T,$$

a straight line. Proceeding farther, write equation (3) as follows:

$$Ve^{1/3}=K_2\,T,$$

and for the cube root of velocity substitute a variable function F''; in turn giving

$$F''=K_2T,$$

likewise a straight line.

With the curves F'—T and F''—T we may make comparisons between corresponding ordinates, in place of being required to make comparisons between ordinates and corresponding areas. If we do not know the values of K_1 and K_2, we may compute in ratios.

This method is applicable to comparisons between the interrelated curves of Article 611, and also to those for the functions as shown in Table 616. Computation of the functions F may be made by the use of logarithmic tables, or more conveniently, by the use of the so-called "log-log" slide rule. These rules, made in 10 and 20-inch lengths, reduce the operation of taking powers and roots, integral or fractional, to the same operation by which multiplication and division are performed with the ordinary slide rule. In our problems powers and roots invariably require quantities to be expressed in potential units.

Fractional exponents may be avoided by splitting them. For example, equation 11 may be written in the form

$$Ve^2=K\,P^3,$$

or $Ve^{1/2}=K\,P^{1/2}$,

indicating the fact that we may either plot the square of velocity against the cube of pressure, or the cube root of velocity against the square root of pressure.

620. Where exponents differ by unity, as in the list of Article 611, straight-line

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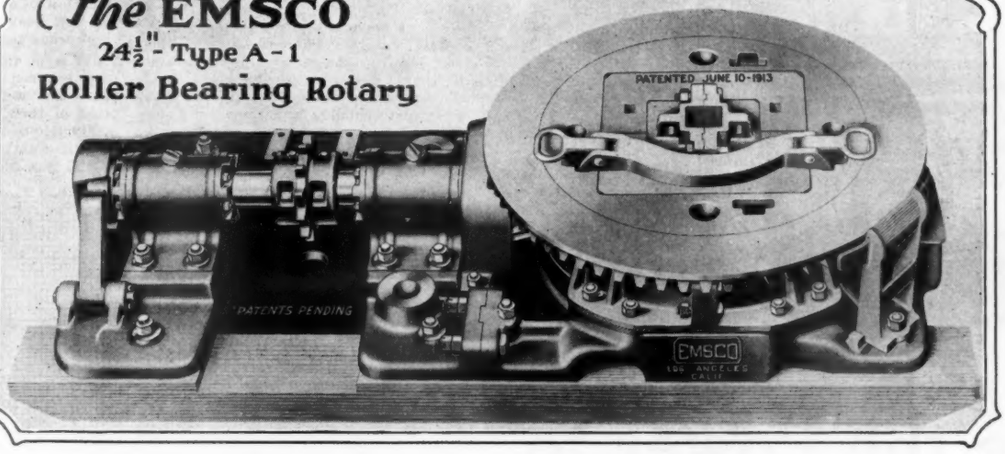

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curves on the Cartesian plat may be obtained in another manner.

Write the equation for velocity,

$$Ve=K_1 T^c,$$

and the equation for pressure,

$$P=K_2 T^c.$$

Thus, if we plot a function F equal to velocity divided by pressure, against time, we obtain a straight line. Again the quantities must be expressed in potential units.

We might also plot volume divided by velocity, power divided by volume, and energy divided by power, all against time, and obtain a straight line. The constant K_1/K_2, if known, is the slope of the line. If it is not known, computations may be carried in ratios in the usual manner.

One or another of these methods may be selected at will according to the nature of a particular problem. The straight line is often desirable when the curve is to be extended ahead of the well's record.

Comparative Performance

621. In order to appreciate the difference between the behavior of reservoirs we should construct relative curve charts which contain two curves in accordance with corresponding equations in Tables 477 and 616. Let us first consider the curves for pressure-velocity relations as shown in Figure 621.

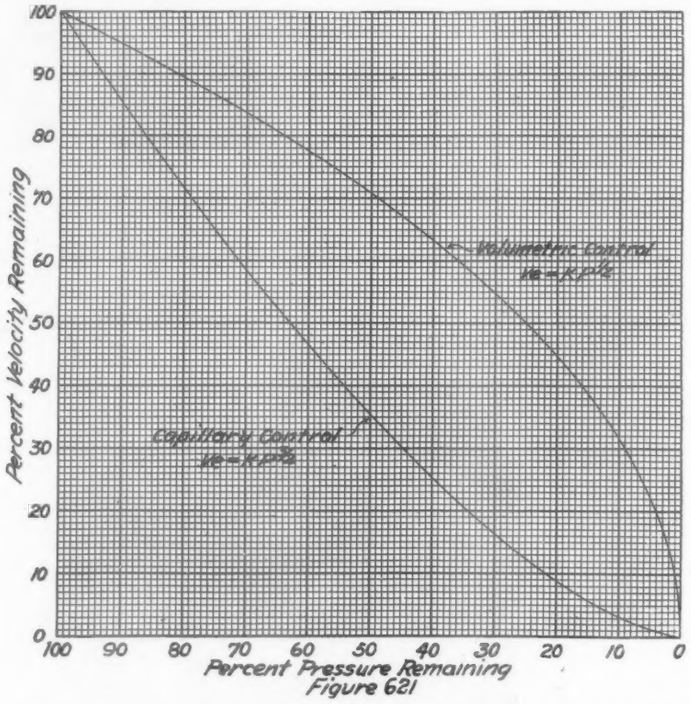


Figure 621

The relative equations are as follows:

Volumetric Control, $Ve=10P^{1/2}$,

Capillary Control, $Ve=1/10P^{1/3}$.

The constants are determined in the usual manner. The former curve, possessing an equation with an exponent less than unity, lies above the straight diagonal line connecting the upper left with the lower right corners of the plat, whereas the latter must lie below such diagonal line. If we imagine the plat divided into equal parts by a vertical line through Per Cent Pressure Remaining=50, we see in the left-hand half that the velocity declines less rapidly with respect to pressure in Volumetric Control than in Capillary Control, while in the right-hand half the opposite is true.

Suppose we have two gas wells, each flowing at the rate of 1,000,000 cubic feet per day when their pressures are 500 pounds, one Volumetric and the other Capillary. How will their rates compare when their pressures have declined to 250 pounds? At the position of P=50 per cent we observe that the well in Volumetric Control produces at the rate of 707,000 cubic feet per day, and the other in Capillary Control produces at the rate of 354,000 cubic feet per day. The difference is a matter of economic importance. Had these been oil wells flowing at the rate of, say, 1,000 bbls. per day when their pressures were 500 pounds, their rates at 250 pounds would likewise have been 707 and 354 bbls. per day, respectively.

If we should be able to find two gas wells such as described—with functions equal at any amount whatever—we would find eventual abandonment necessitated by lack of pressure in the Volumetric Control well, and by lack of velocity in the Capillary Control well. This is indicated by the curves as they appear in the lower right-hand corner in a square, say, 30 per cent wide and 30 per cent high.

The curves also explain how an oil well in Capillary Control can continue its production near the point of equilibrium with comparatively little decline in the rate of flow. An oil well in Volumetric Control declines very suddenly in rate of flow near the end when the pressure approaches zero.

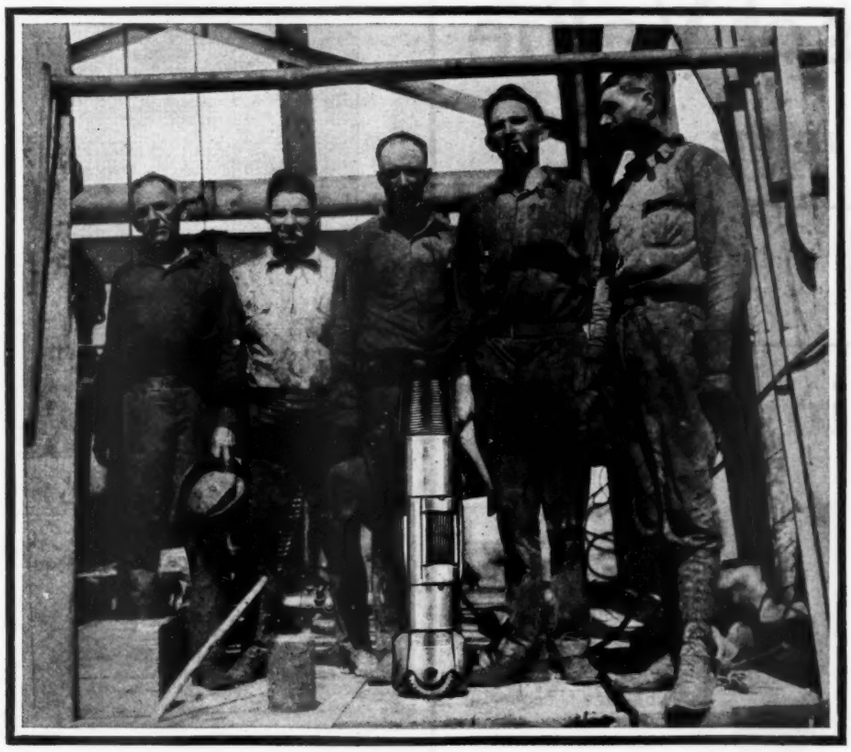
It is of interest to note the comparison between pressures when our imaginary gas wells have declined to 50 per cent of their rates of flow; i.e., to 500,000 cubic feet per day. The well in Volumetric Control has declined in pressure to 25 per cent, or 125 pounds, whereas the well in Capillary Control has only declined to 63 per cent, or 315 pounds.

Volume-Velocity Relations

622. As a second consideration let us imagine that we have two gas wells, each flowing at the rate of 1,000,000 cubic feet per day, and each capable of producing a total of 500,000,000 cubic feet of gas, one Volumetric and the other Capillary. Although the fact is that the potential lives of these wells are found to be 1,000 and 2,000 days respectively, by Articles 436 and 598, we shall now ignore the function T, and construct the relative curves between the derived relations of volume and velocity. The curves are shown in Figure 622.

Both exponents are less than unity; therefore both curves lie above the diagonal line from the upper left to the lower right corner. The exponent for Capillary Control relations is nearer unity than the other exponent; so the curve for the former underlies the curve for the latter.

When both wells have declined to 50 per cent of their rates of production; i.e., to 500,000 cubic feet per day, there remains to be produced from the Volumetric Control well 25 per cent of the total volume, or 125,000,000 cubic feet.



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--6--

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while from the Capillary Control well there remain to be produced 39.6 per cent, or 198,000,000 cubic feet of gas.

When both wells have produced 50 per cent of their total volumes, the Volumetric Control well is producing at the rate of 707,000 cubic feet per day, and the Capillary Control well is producing at the rate of 594,600 cubic feet per day.

If it should happen that the rate of 100,000 cubic feet per day proves to be the economic limit, below which it does not pay to operate the well, we see from the curves that we abandon 1 per cent of the total volume, or 5,000,000 cubic feet, in the well of Volumetric Control, and 4.64 per cent, or 23,200,000 cubic feet, in the well of Capillary Control.

Other Derived Relations

623. If, as suggested in Article 616, we cut the relative curves of Figures 442 and 586 by vertical lines, we need only seek, for the problem of Article 621, the ordinate P=50 per cent on the pressure-time curve, and Ve=50 per cent on the velocity-time curve, draw the vertical lines through these points, and observe the values of other functions as determined by the intersection of the vertical lines with the curves of the functions. Likewise, for the problem of Article 622, the vertical lines are located by the points Ve=50 per cent, and Vo=50 per cent. Although the same results are obtained by this method, we do not have the interesting picture of the relations between the functions, when these are considered independently of T. (Article 478). Furthermore, by placing corresponding curves for the two controls upon one plat, comparisons are more easily visualized.

In order to fulfill the relations shown in Figures 621 and 622, the quantities must be expressed in potential units. If changes are made in the conditions of production from the wells, new potential reservoirs are established, and the curves may be considered as starting again from the upper left-hand corner of the plat. Numerical values for the functions will be different, but they will decline according to the very same curves.

Identical changes in the conditions of production from the two wells above produce different effects. This we shall see when we study theoretic performances for the present control. Comparisons will again be made between two imaginary wells.

Perhaps the most important of derived relations are those between pressure and volume. This subject has already been discussed to some extent in preceding articles, but there yet remain several especially important features to be brought out in the next installment. Interesting comparisons between two imaginary wells for all the couplets of Tables 477 and 616 can be made, and a number of valuable facts can be elucidated by them. In view of more fundamental principles yet to be studied, we shall not take these comparisons up in the present treatise.

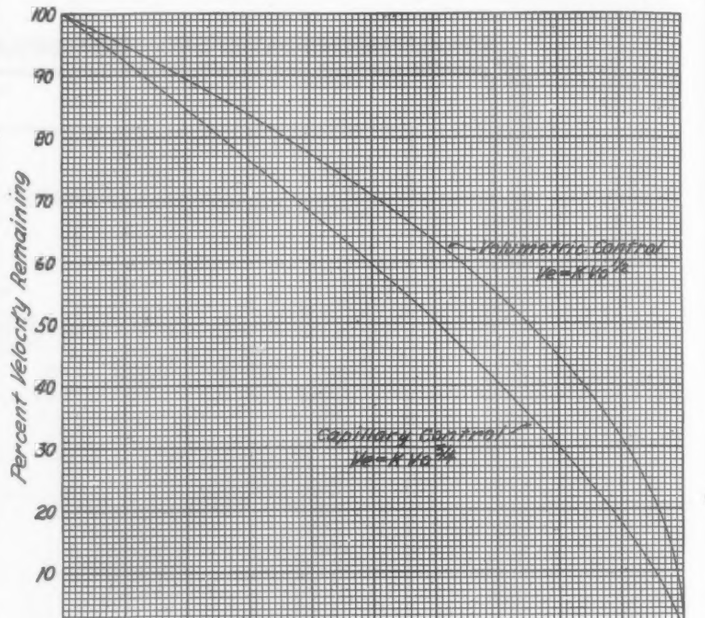

Figure 622

EASTERN FIELDS

(Continued from Page 58)

pleted last week and reported a duster, is now showing some oil and will make a very light pumper.

Clay County

Some of the late completions in the Big Injun sand development in Henry district, Clay County, are light, bringing down the average size of the wells for that pool. The Virginian Gasoline & Oil Co. has completed No. 3 on the Swan, Goshorn & Geary tract and good for 10 bbls. a day. The location is 450 feet west of the second test on this tract. The Ohio Fuel Oil Co. is due in the sand at No. 9 on the J. B. Casto 220 acres. The South Penn Oil Co. is drilling Nos. 17 and 21 on the O. D. Stockly farm. The same company is drilling two wells on the R. S. Kyle farm and two on the Joseph Belcher farm.

Gasser in Kanawha County

On Falling Rock Creek, Big Sandy district, Kanawha County, the United Fuel Gas Co.'s test on the J. O. Morrison farm is a gasser good for 500,000 feet. In Union district, Pleasants County, the Big Bend Oil Co. has now drilled a test on the McCoy heirs farm through all sands and dry.

Tests Drilling and Starting

On Dutchman Run, Murphy district, Ritchie County, W. R. Hays has the rig up for a test on the Levi Wilson farm. On Little Paw-Paw Creek, Marion County, the Owens Bottle & Machine Co. has the rig completed for a test on the Charles Toothman farm. In Upton district, Tyler County, Morgan Brothers have started to drill on the Belle Williams farm. In Greene district, Wetzel County, A. F. Lawrence has rig material at a location on the E. A. Booth farm. In Clay district, the Johns Oil & Gas Co. is rigging up on the B. W. Peterson farm.

In Liberty district, Marshall County, the Manufacturers Light & Heat Co. has started to drill on the D. W. Keller farm. In Skin Creek district, Lewis County, the Mud Lick Oil Co. is rigging up on the J. W. Linger farm. In Sherman dis-

trict, Calhoun County, the Hope Natural Gas Co. has started to drill on the F. C. Stump farm. In the same district, McIntosh & Scott are rigging up on the J. M. Morgan heirs farm.

In New Melton district, Doddridge County, Trainer & Travis are building a rig on the G. A. Ross farm. In Ten-Mile district, Harrison County, Burke & Lyons are still fishing at a second test on the W. T. Williams farm. In Greene Township, Wetzel County, A. F. Lawrence has abandoned his location on the E. A. Booth farm. In Union district, Marshall County, the Spider Oil & Gas Co. is rigging up on the Anna Jochum farm.

In Freemans Creek district, Lewis County, the Pittsburgh & West Virginia Gas Co. has started to drill on the E. M. Waugh heirs farm. In Skin Creek district, the Mud Lick Oil & Gas Co. has started to drill on the J. W. Linger farm. On the middle fork of Buchannon River, W. E. Sloughtenhoupt is drilling at 2,400 feet on the J. J. Bitler farm. The last named is a wildcat, far removed from production.

In Collins Settlement district, Lewis County, the Petroleum & Star Oil & Gas Co. has a rig up on the Grace Rhodes farm. In the same district, C. W. McCall & Co. are drilling at 1,000 feet on the J. A. Carothers farm. In Skin Creek district, the same company has a rig up on the Dora Linger farm. The Duncan Oil & Gas Co. is drilling at 1,820 feet on the H. H. and E. Duncan farm.

Ritchie County

In Murphy district, Ritchie County, Hays & Roberts have started to drill on the Levi Wilson farm. In the same district, the Hope Natural Gas Co. is hauling tools to a location on the Joseph Mathers farm.

In Carroll district, Lincoln County, the Ray Gas Co. has started to drill a test on the W. R. and P. H. Lockwood farm. In the same district, the Transylvania Petroleum Co. is due in the sand on the Bird Maddox farm. In Barboursville district, Cabell County, Ortman & Stipe have started to drill on the J. M. Waugh farm. In the same district, the same company has made a location on the Joseph Merritt, Jr., farm. In Walker district, Wood County, the Four S. Oil & Gas Co. is drilling at 900 feet at a second test on the Cogdon farm and the Woodyard Oil Co. at 1,600 feet at No. 10 on the Elgie Grant farm.

Southwest Pennsylvania

Late completions in the southwest Pennsylvania fields are all gassers in Greene County. There is little doing in other counties. In Perry Township, the Martin Oil & Gas Co.'s No. 3 on the Josephus Fox farm is a gasser in the Big Injun sand. In the same district, the Peoples Natural Gas Co.'s test on the Noah L. Haines farm is a gasser in the Gantz sand. In Richhill Township, J. J. and G. W. Boundy have a Big Injun sand gasser at a second test on the W. S. Hughes farm.

INDIANA-ILLINOIS IS FIFTH IN REFINING

(Continued from Page 54)

and effects back of this almost uniform "swing" is not realized until the gasoline storage line of this area is compared with other areas.

Refiners Control Situation

And this marvelous balancing up of output and market, not for gasoline alone but for the other products as well, clearly shows that the refiners of this area have never let the situation get out of control.

With a vast market—and one into which it has been difficult for other refining areas to enter—and running to stills today more than six times as much crude as it is producing—the Indiana-Illinois area has been most favorably situated so far as being able to balance output and market is concerned.

The refining situation in this area has been built on the foundation of a combination of unusually favorable basic conditions and, having them clearly in mind, it can readily be understood how it is possible for the refineries in this entire area to be operated, in the aggregate—and without the slightest tendency towards "monopolistic control"—so that the graph of their runs, output and storage shows an almost ideal economic situation.

Of the 41 refineries in the Indiana-Illinois area only five, with an aggregate rated daily capacity of 91,500 bbls., are Standard Oil, the remaining 36 with 123,700 bbls. daily capacity are what are usually referred to as "independent." The large graph is the best possible proof that the common problems of all of the refiners in this area have been worked out constructively and with marvelous conservatism and safety.

Cracking Processes

Of the Standard refineries all are equipped with cracking processes, while 15 of the independent refineries are so equipped. During the year 1925 the plants in this area produced a grand total of 1,461,000,000 gallons of gasoline. Of this amount 57 per cent (837,000,000 gallons) was "straight run"—40 per cent (580,000,000 gallons) was cracked—and 3 per cent (44,000,000 gallons) was natural gas gasoline.

As "cracking" is today the most important single economic factor in refining, and as the Indiana-Illinois area is the birthplace of the first commercially successful cracking process—the Burton—it is interesting to note that if, in 1925, there had not been a single cracking still in this area, and the 1,461,000,000 gallons of gasoline made in this area last year had been made by "shell" stills, the refiners would have been forced to buy and run 40,000,000 bbls. more crude oil than they actually run.

It is interesting to note that during the year 1925 the output of straight run gasoline ranged between 55 and 62 per cent—of cracked gasoline between 35 and 42 per cent—while natural gas gasoline was 4 per cent for 1 month, the other 11 months being 3 per cent. And while the proportion of straight run and cracked gasoline swung over a range of 7 per cent the proportion of the total output was the same for the last half of the year as for the first half.

Taking this area as a whole, and the 41 scattered refineries most of which may be classed as small plants—and only a few of which are either large or integrated—the surprising thing is that over a period of eight years, the output has been so admirably balanced with the market.

ARTESIA, NEW MEXICO

(Continued from Page 48)

ting off water at 1,940 feet; Colorado Drilling Co.'s No. 1 Irvin, SE SE, Section 8-16-27, fishing for tools; Cook-Ironsides and others' No. 1, Section 10-20-29, preparing to start operations; Compton's No. 2, Mann permit, Section 3-18-27, drilling; Compton, Hasenfuss & Lewellyn's No. 1 in the SW SW, Section 16-18-28, producer; Dome Oil Co.'s No. 6, SE cor. NE, Section 21-18-28, drilling below 1,600 feet; Flynn, Welch & Yates' No. 39, SE, Section 21-18-28, pulling casing to shut off top pay; No. 40 in SE. Section 29-18-28, fishing; No. 41, SW cor. NW SW ,Section 3-18-28, drilling below 1,950 feet; No. 42, NE cor. NW SW, Section 3-18-28, drilling below 2,000 feet; No. 53, SE cor. NE, Section 28-18-28, on production; No. 44, NE SW, Section 9-18-28, cleaning out after shot; No. 45, in the NE SE, Section 21-18-28, drilling below 500 feet; Fletcher Oil Co., in SW, Section 5-19-28, drilling below 2,565 feet; Frontier Petroleum Co.'s No. 2, McQuigg Brothers' lease, Section 4-18-28, fishing; No. 4, Section 4-18-28, cleaning out after shot; No. 11, Section 4-18-28, drilling; Hasenfuss, Donley's No. 1, NE NE, Section 13-18-27, drilling below 950 feet; Levers-Wilson's No. 5, C SW SE, Section 18-18-28, on production; Mesa Oil Co.'s No. 1, Section 4-19-28, cleaning out after shot; Navajo Oil Co.'s No. 1, Section 28-18-28, 8 feet of sand at 2,004 feet, drilling below 2,050 feet; Ohio Oil Co.'s No. 1 Edgerton, NW NW, Section 18-18-28, abandoned at 3,008 feet; Ohio Oil Co.'s No. 5 Toomie Allen, NE SE, Sec-

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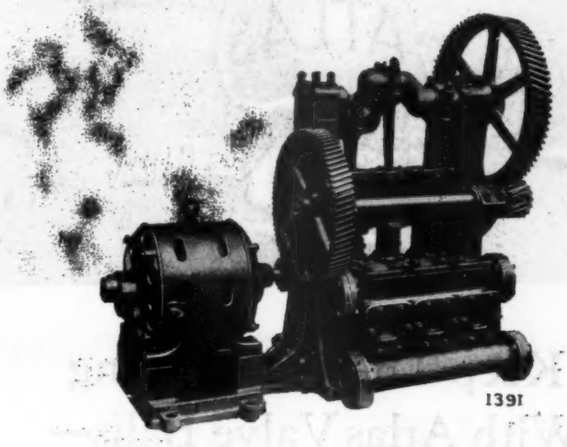

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tion 28-18-28, drilling deeper at 2,255 feet; Ohio Oil Co.'s No. 9 New State, SE SW SE, Section 4-18-28, drilling at 3,750 feet; A. H. Ramage's No. 1, SW SE, Section 2-18-28, cleaning out after shot; Rehn & Harris' No. 1 Winans, NW NE, Section 15-18-26, drilling at 350 feet; Shaw & Rathke's No. 1 Danciger, Section 20-18-28, abandoned at 3,400 feet; Swartz, Compton & Eaton's No. 1 Brainard permit, NE SW, Section 5-18-27, drilling below 1,250 feet. Twin Lakes' No. 8, NW cor. SW, Section 28-18-28, drilling below 1,450 feet; Texas Production Co.'s No. 5, NW NE NE, Section 8-18-28, drilling below 900 feet; Wade & Bujac's No. 1 Goodale, Goodale permit, NW NW, Section 19-18-28, shut down at 1,675 feet with engine trouble; Wooley & Jones' No. 1 Beeson, SE cor. Section 33-17-30, drilling below 1,165 feet.

Chaves County

Arkansas Gas & Fuel Co.'s No. 1 Manning Dome, SE cor. Section 14-15-17, underreaming 8-inch casing; Colorado Gas & Fuel Co., NW SW, Section 16-8-27, drilling below 4,925 feet; Neal and others, Section 25-9-25, drilling below 1,350 feet; Rogers and others' No. 1, Section 15-11-26, drilling below 950 feet.

Lea County

Maljamar Oil & Gas Corp.'s No. 1 Baish, NE, Section 21-17-32, setting 6⅝-inch casing at 3,603 feet; No. 1 Grace Mitchell permit, SW cor. Section 5-17-32, moving tools; No. 1 Beardsley permit, NE cor. Section 15-17-32, location made; No. 1 Pearsall permit, NE cor. Section 33-17-32, moving tools; No. 1 William Mitchell permit, SW cor. Section 17-17-32, location; No. 1 Pearl Miller permit, NW, Section 23-17-32, drilling below 100 feet; Shugart and others' No. 1, SE SW, Section 1-17-31, location; Ross' No. 1, Section 27-10-32, drilling below 2,400 feet.

CALIFORNIA FIELDS

(Continued from Page 46)

are becoming few and far between. The recompletion of No. 9 Rubel by the Petroleum Securities during the early part of this week relieved the monotony by coming in flowing 1,226 bbls. of 23.2 gravity oil after being cleaned out to bottom, 2,455 feet.

Torrance

The Chanslor-Canfield Midway Oil Co. finished a 370-bbl. producer when No. 58 Del Amo in the Torrance Field was put on production at 3,580 feet. The oil is of a rather low grade, however, testing only 15.9 degrees and showing a cut of 3 per cent. The Fullerton Oil Co. also chalked up a new well in this field, although its No. 6 Waddell was a distinct disappointment. This new producer, which was carried down to 3,517 feet and finished with a 6¼-inch oil string carrying 600 feet of shop perforated, showed an initial pumping of 45 bbls. daily, the oil testing 25.4 degrees and showing a cut of 20 per cent. The Superior closed the week with a 195-bbl. pumper of 18.4 gravity oil when its No. 29 Torrance was put on the beam at 3,824 feet after being finished with a 6¼-inch oil string carrying 315 feet of 80-mesh screen.

When the General Petroleum purchased the properties and equipment of Walter H. Fisher a few weeks ago, work was immediately resumed on No. 15 Athens, which had been standing suspended for some time at 4,400 feet. The company has just put this well on a production test from the 4,700-foot level and it is making 265 bbls. of 31.8 gravity oil, which is cutting around 15 per cent. The Union cleaned out No. 16 Howard Park and returned it to production making 55 bbls. of 34.3 gravity oil from 4,982 feet. The Union also put No. 13 Callender at Dominguez on a production test and, while it registered a small flow from 4,400 feet, it did not make much of a showing. Further work, however, will be productive of better results. The Shell has a very promising looking well in No. 3-B Reyes, at present rotating ahead at 4,135 feet.

There were no developments of particular interest in the Montebello, Richfield or Fullerton districts during the week but practically all of the drilling projects in those areas registered satisfactory progress. The Standard is stepping right along with a six-well program at Montebello, involving its Baldwin, Temple, Harvey and Howard Smith leases. The St. Helens Petroleum, with the spudding in of No. 3 Mulholland, is now running three strings of tools in this district. The Union is running approximately 10 strings of tools in the Fullerton, Richfield and Coyote districts and the staking of two new locations indicates a possibility of slightly increased work.

Huntington Beach

The drilling restrictions which have prevented work in that area at Huntington Beach lying between Palm Avenue and the ocean front and running from Seventeenth to Twenty-third Streets were lifted on April 29 and the race down to the pay is already on. The City Council of Huntington Beach recently adopted a set of regulations under which the new area will be developed and, while they specify steel derricks, it is quite possible that several wooden rigs will go up within the next few weeks, because of the fact that the new set of regulations will not go into effect for 30 days or until May 29. The City Council, as a precautionary measure to reduce the fire hazard will also require covered sump holes, although operators will not be obliged to comply with this procedure previous to the expiration of the 30 days' notice as mentioned above.

Development work at Huntington during the week resulted in the completion of a 188-bbl. well when the Standard's No. 40 on Lease B was put on a test. The oil, which is coming from 4,405 feet, tests 23.1 degrees and shows a cut of 8 per cent. The company has three additional drilling projects on this lease, which lies just north of the new town lot area now open for drilling and it is believed that some additional work will be undertaken within a short time, possibly in the southern part. The Jamison Crude Oil Co., which took over the old Hamilton-Winpenny well, contemplates carrying it down to the 5,000-foot level for a thorough test and, although it has not shown anything of importance from the grass roots down to 4,510 feet, the company is not the least bit discouraged.

Seal Beach

Activity in the Seal Beach area, which has been at a rather low ebb during the past several months, is beginning to pick up again with the starting of the Union's No. 1 Bryant. This company secured a lease some time ago on 144 acres lying just north of the Shell's Bryant property and, although the Union has only started hauling in materials, it is thought that actual spud will be made within the next two or three weeks. The Shell suspended work on No. 4 Bryant during the early part of the week at 4,897 feet and it is understood the company is contemplating abandoning this hole, together with No. 2 Bryant, a deep test carried down to 6,139 feet. If this procedure is followed out, the Shell will sit back and allow others to prove or disprove the existence of commercial production in this area.

Notwithstanding the fact that over $500,000 has already been spent in exploratory work, the productivity of the Seal Beach district is still undetermined, as operators have yet to find a definite productive structure. The unsuccessful efforts of the Shell to secure commercial production and the equally disheartening results secured by the Marland in its No. 1 Bixby, at present drilling ahead at 5,260 feet, narrows the prospective productive area down to the Associated's Hellman lease, or the Union's Bryant property somewhere to the north and west. Neither of these leases has had a favorably located test, although the Associated suspended work on No. 1 Hellman, its first attempt several months ago, since which time it has been drilling a series of shallow survey holes to find the trend of the structure before undertaking any further work.

Midway-Sunset

The Standard finished two wells in the Midway-Sunset area during the past week,

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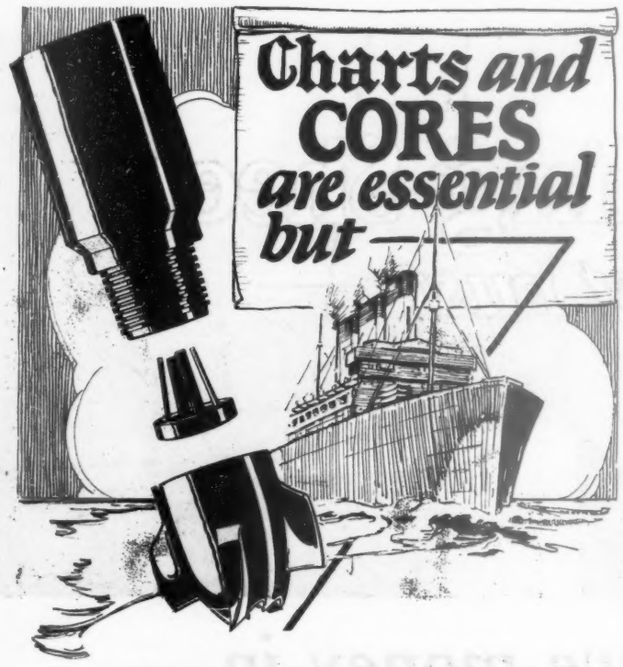

Charts are vitally essential in marine operations. Cores are even more essential in oil well drilling operations, because you cannot possibly see anything 'way down in the hole you're drilling in old Mother Earth. They furnish a plain, clear, simple chart of your well from spudding in to production, eliminating the guess and gamble from your operations.

they must be perfect

Remember that, always. A defective chart or core might be worse than none at all. It's imperative that you have perfect cores. There is no consideration of sufficient importance to warrant your taking a chance on imperfect or defective ones.

The Elliott Core Drill insures perfect cores so far as that is humanly, scientifically, and mechanically possible. The design and construction of the Elliott Drill are as near "failure-proof" as ever has been achieved up to this time because this tool has been the subject of intensive development over a period of many years by an organization of drilling and coring specialists.

Just how much the taking of "perfect cores" depends upon design and construction might surprise and startle you, especially if you've been using cheap or inferior drills. Maybe you've been lucky. But don't take any more chances. Get in touch with the nearest Elliott Service Branch and let the Elliott Driller tell you the facts.

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one in Section 19-31-24 and the other in Section 10-11-23. The former was No. 54 Pacific, which came in doing 192 bbls. of 26.4 gravity oil from 4,530 feet, while the latter was No. 1 Rass, redrilled and deepened from 4,976 feet to 5,175 feet. It is making 180 bbls. of 27.1 gravtiy oil and, although the crude is of a good quality, it is not believed that any further work will be undertaken because of the extreme depth required for production. The Balboa Oil Co. chalked up a splendid producer when No. 41 was brought in from 3,828 feet. The new well, located in Section 24-31-23, started off flowing 431 bbls. of practically clean 27.2 gravity oil daily. The crew immediately transferred to No. 27 and spud has already been made.

The Julian Petroleum's No. 1 Midway Northern out in the Maricopa Flats, Section 32-12-23, was originally scheduled to be carried down to the deep zone but the rather unfavorable results obtained to date resulted in a change of plans and it was finished in the upper sand doing 100 bbls. from 2,773 feet. The California Petroleum's No. 5 Dorothy in Section 34-32-24, required two cement jobs before a satisfactory water shutoff was secured but perseverance finally won out and the output is cutting less than 1 per cent. The well was finished at 3,358 feet and came in flowing 588 bbls. of 26.7 gravity oil daily. King Gillette's No. 2-B in Section 21-31-22 picked up the pay at 650 feet and this well will undoubtedly result in shallow production as did No. 1-A, No. 2-A and No. 1-B. The Kendon Petroleum has plugged back its No. 3 in Section 35-32-23 from 2,540 feet to 2,430 feet and will give it a test as soon as the 8¼-inch has been perforated.

Southern California Wildcats

The Standard has just spudded in No. 1 University at San Fernando, but it will probably be three weeks or so before the company can get under way with its wildcat in Topango Canyon, as it has been found necessary to do a little road construction before the rig can be erected. The Associated has taken a lease on 50 acres at Topango for protective purposes only and no work is contemplated, unless of course the Standard secures commercitl production. No. 1 McNally of the Union at La Mirada was checked yesterday at 5,180 feet and, in view of the absence of any favorable indications, the outlook is particularly discouraging. George W. Johnson is making splendid progress with his No. 1 Martin at Manhattan Beach and this wildcat, now at 2,600 feet, will prove a very interesting test within the next 30 days. The Julian Petroleum resumed work in No. 1 Hellman last week, after a temporary suspension, and the bit is at present rotating ahead in a sandy shale at 1,870 feet.

The Marland's No. 1 Connelly at Hyde Park has practically been given up at 4,960 feet, although, of course, the hole will be carried down for a conclusive test before being abandoned. No. 1 Wickham of this same company, in the Newhall-Saugus area, will be given another test within the next week or ten days, but nothing big is anticipated. The Milham Exploration Co. has temporarily suspended work in No. 2 Conroy in this general area but is still going ahead with its wildcat at Playa del Rey, now down 4,800 feet. The Umpire Petroleum moved into Alamitas Heights a few weeks ago, intending to drill a wildcat at that point, but the refusal of the Long Beach City Council to lift the drilling restrictions has prevented the company from spudding in.

Northern California Wildcats

The Union has just about finished rigging up its No. 1 Theta, a second structure survey hole located in Section 23-28-20, northwest of the old Belridge Field, and spud is expected to be made within the next few days. The Marland's No. 1 Lazard in Section 27-26-20 is rotating ahead in a sticky shale at 3,360 feet. The Milham Exploration Co. is still leasing in the Buttonwillow district but will, nevertheless, spud in No. 1 Hidye in that area, Section 17-28-23, as soon as possible. The Honolulu Consolidated Oil Co. has entered into an agreement with Hastain & Purman to finish the latter's test in the Gould Hills, Section 1-29-20. This well showed up unusually well several weeks ago at 1,490 feet and the Honolulu, in addition to profiting by the individual completion, will also prove up some of its nearby holdings.

The Shell encountered some fairly good showings in No. 1 Vedder in the Poso Creek area, Section 9-27-28, but the company ran into the usual water difficulties characteristic of this area and another cement job will be necessary at 1,885 feet. The company is not sparing any expense in testing out this section as it has somewhere around 10,000 acres under lease. George F. Getty's No. 1 Arnold, some distance away in Section 20-27-27, cored a fairly good looking sand at 2,108 feet and a string of 11-inch will be landed around 2,075 feet. The Marland has secured an additional 70 acres of land about midway between McKittrick and Devils Den in Section 9-28-20 but is not obliged to start work for another year, unless production is secured on adjoining property in the meantime. The Associated is still held up with a fishing job at Huron and this wildcat in Section 20-19-17 is being delayed at 1,770 feet pending recovery.

The Bolsa Chica Oil Co. is preparing to resume drilling in its Kettleman Hills wildcat which showed a little oil some time ago at 1,978 feet. The Marland has just finished redrilling its wildcat in this same area and should begin making new hole at 5,502 feet within a short time. The General Petroleum has just secured a lease on 160 acres of prospective oil land 4 miles east of Famosa in Section 12-27-26. The company has five years in which to begin drilling and will pay a one-eighth ropalty in the event that commercial production is developed. The Shell's No. 1 Berlywood near Moorpark is in a hard gray sand at 3,300 feet. The Pyramid Oil Co. secured a satisfactory shutoff in its Monterey County wildcat at 1,853 feet and drilling is being resumed.

GULF COAST

(Continued from Page 44)

the early days drillers did not core formations, or they were not as well posted on formations as the driller of today. All of which is true. During the early days of wildcatting, tests seldom got below 2,000 feet or 2,500 feet as the extreme limit. The modern wildcatter starts his test with 3,500 feet or lower in view.

The major companies have developed wildcatting in the Saline dome sections of Texas and Louisiana into almost an exact science, or as nearly so as is possible in hunting for oil. The prospective dome is first tested geophysically with the seismograph and torsional balance. An explanation of these instruments and their application appears on Page 36 of the April 22 issue of The Oil and Gas Journal. If the geophysical tests denote the presence of rock salt in mass, then shallow formation tests are drilled with light gasoline driven rotary rigs to determine the area of the Saline uplift. These tests range from 600 to 1,100 feet or deeper. Having determined the extent of the area of the salt uplift, or dome, deeper tests are drilled off the sides in an effort to find the oil-bearing sand. Searching for the oil-bearing sands off the sides of these domes is an expensive proposition, because scores of holes may be drilled before the true sand is found. It is like stepping down off the dome a few feet at a time, each step marking a well in the search for the sand.

Usually the first tests go into shale or shaley sand, which may contain some oil. All this is more than merely mechanical. The formations are examined by geologists and paleontologists and on their reports the production departments are guided. Scientific deductions may suggest new locations or deeper drilling. Finally the producing sands are found. Only the major companies can afford to maintain these scientific organizations, so it has come to pass that the large corporations control most of the new producing pools. The individual operator, or small com-

They Needed Good Pipe for This California Oil Line

THE Los Angeles Midway Pipe Line, recently completed, is the longest welded pipe line in California. Of the 137 miles, there are 8 miles of 10-in., 46-lb. and 129 miles of 10-in., 40.5-lb. plain end "NATIONAL" Lap-weld Pipe. The line has a capacity of 30,000 barrels a day.

The accompanying photographs give an idea of the character of the country in the Tejon Mountains over which the line runs. Near the summit were some very deep canyons and to cross these some unusual vertical bends were required. In order to secure safe anchorage, the trench was made twenty feet deep in a number of places. In level country the trench was 18 inches wide and 40 inches deep.

An interesting feature of the mountain region is the wide variation in temperature. In twenty-four hours the thermometer reached as high as 110 in the middle of the day and went down as low as 23 above zero at night.

No expansion joints were used anywhere in the line; it is believed the depth to which the pipe is buried will take care of any stresses due to expansion and contraction. The entire line was coated with asphalt paint which was very carefully applied. When the line was completed, a water pressure of 800 to 900 pounds was placed on the line.

While much credit belongs to the skill of the workmen and the wise supervision of the job, still a share may go to an ever ready and adaptable pipe whose characteristics—more particularly, strength—ductility—and fine welding qualities—meant much in the general success of laying the line.

Bulletin No. 26—Autogenous Welding of "NATIONAL" Pipe—will be sent upon request.

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If these statements interest you and you want more information on Reid Gas and Oil Drilling Engines, write for our Bulletin No. 28. We will be glad to send it to you.

JOSEPH REID GAS ENGINE COMPANY

OIL CITY, PENNSYLVANIA, U. S. A.

BRANCHES AND AGENCIES—Marietta, Ohio; Logan, Ohio; Newark, Ohio; Shreveport, La.; Charleston, W. Va.; R. B. Moore, Bolivar, N. Y.; Frick & Lindsay Co., Bradford, Pa., and Kentucky Distributors; S. R. Shoup, 708 Pacific Electric Bldg., Los Angeles, Cal.; Frick-Reid Supply Company, Tulsa, Oklahoma, and Branches, Distributors for Oklahoma, Kansas, Texas, Arkansas and Wyoming.

EXPORT SALES REPRESENTATIVE—Oilfield Equipment Co., Inc., 30 Church St., New York City

BRANCH SHOP—TULSA, OKLAHOMA

pany continues to wildcat on the old hit-or-miss theory. Consequently most of the wildcats miss.

Boling Pool's Deepest

The deepest test in the new Boling Pool, which is still in the making, is the Vacuum Oil Co.'s No. 1 Hooper, drilling around 4,400 feet. The Humble-Gulf Oil Co.'s joint No. 2 Hawes is pumping 10 bbls. No. 3 is drilling around 3,200 feet and No. 5 below 4,130 feet. No. 7 is rigging, as is No. 9, with locations for Nos. 8 and 10. The Oxford-Southern Oil joint No. 1 Floyd is working over. No. 4 is rigging, with a location for No. 5. The Sinclair Oil & Gas Co.'s No. 1 Taylor is waiting on a standard rig to pump. No. 2 is fishing at 3,550 feet, as is No. 3 at 2,975 feet. A derrick is standing for No. 6. The Sun Oil Co.'s No. 3 Taylor is shut down. No. 5 is also shut down. No. 1 Farmer, on the east side, is around 450 feet. The Texas Company has a location for No. 1 Farmer and is rigging No. 1 Felder. In the producing area that company is drilling No. 5 Taylor at 3,710 feet, and No. 8 at 3,210 feet. A derrick is up for No. 9. No. 1 Floyd is around 2,545 feet. The Atlantic Oil Producing Co.'s No. 3 Taylor is idle. No. 4 is drilling below 2,910 feet. J. K. Hughes' No. 1 Mullins set and cemented casing. The Gulf Production Co.'s No. 1 Mick, northwest of production, is around 1,455 feet.

Liberty County Pools

In the Hull Pool the Republic Production-Houston Oil joint No. 124 Dolbear 800 acres, on the east side of the dome, is drilling below 2,235 feet. No. 125 is at 2,010 feet. Derricks are up for Nos. 126, 127 and 128. On the Phoenix to the southeast, Gulf Production Co.'s No. 65 is drilling around 3,860 feet. No. 3 Thomas fee is at 2,635 feet. No. 17 Baldwin fee is at 1,235 feet. No. 17 Scarborough is around 1,435 feet and No. 22 Morris-Phillips at 1,345 feet. The Humble Oil & Refining Co.'s No. 21 Guedry is sidetracking. No. 3 Sterling is around 4,345 feet and No. 4-B Abel at 1,565 feet. A location has been made for No. 5 Merchant. The Texas Company's No. 1 Hannah set and cemented casing at 3,100 feet. The Mecom Oil Co.'s No. 2 Taylor is deepening at 2,545 feet, with a derrick standing for No. 9 Taylor. The Houston Production Co.'s No. 9 Abel is at 900 feet. The Empire Gas & Fuel Co.'s No. 19 Barngrover is drilling around 875 feet.

In the South Liberty Pool, the Humble Oil & Refining Co.'s No. 1 Deussen is drilling at 2,954 feet. The Coastal Oil Co.'s No. 1 Lecoure and the Humble Oil & Refining Co.'s No. 2 Welder, on the west side of the Trinity River, are shut down on account of high water.

The Harrison Oil Co.'s No. 2 Schlender, on the southwest side of the North Dayton Pool, is drilling around 2,280 feet.

Harris County Pools

In the Goose Creek Pool, the Sun Oil Co.'s No. 8 Wright is rigging. The Gulf Production Co.'s No. 11 Chapman-Bryan is at 4,810 feet. No. 5 Hirsch is around 3,365 feet. No. 12 J. Galliard is at 3,910 feet. No. 7 Wright is drilling around 1,980 feet. No. 8 State land is at 3,010 feet. No. 33 Beaumont is below 1,235 feet. The Humble Oil & Refining Co.'s No. 67 Smith is working over at 2,670 feet and No. 68 Smith is drilling at 4,210 feet with No. 9 working over. No. 22 Peninsula is around 2,765 feet. The M & B Oil Co.'s No. 4 Scorrgea is at 3,655 feet. The Powell Oil Co.'s No. 6 Bryan is idle at 4,500 feet.

At Pierce Junction, the Gulf Production Co.'s No. 11 Taylor is deepening. The Navarro Oil Co.'s No. 2 Cain is drilling around 4,035 feet. The Rio Bravo Oil Co. has a derrick standing for No. 3-P Settegast.

In the Humble Pool, the Southern Petroleum Co. is cleaning out old wells on its Landslide lease and increasing its production. The Sun Oil Co. is drilling No. 32 River with locations for Nos. 33 and 34.

Fort Bend County

In the Blue Ridge Pool, the Invincible Oil Co. is rigging No. 3 fee to drill it deeper. The Gulf Production Co.'s No. 7-B Bleakely is also rigging to drill deeper. Abercrombie and others' No. 1 West-Schenck is a derrick.

The Gulf company is drilling No. 10 Wheat and Nos. 26 and 28 Davis at Big Creek.

At the Nash Dome, the Rycade Petroleum Corp.'s No. 6 Nash is drilling around 3,915 feet and No. 7 Nash at 4,305 feet. No. 3 Flessner is at 2,395 feet. No. 2 Wisdom is around 4,130 feet and No. 6 is below 1,985 feet.

Orange Pool

The Gulf Production Co.'s No. 9 Peveto is drilling around 4,385 feet. No. 3 Hager is drilling around 5,000 feet. No. 23 is rigging. No. 9-B Kishi-Lang is at 4,655 feet. The Brownie Babbittee Oil Co.'s No. 4 Carbello is around 4,765 feet. The Supreme Oil Co.'s No. 4 Jackson is at 3,010 feet. The Kishi Development Co.'s No. 7 McGuire is drilling around 4,675 feet. The Rycade Petroleum Corp.'s No. 2-B Cow Bayou is drilling at 4,890 feet. No. 5 is around 2,455 feet. The Sun Oil Co.'s No. 1 Belisle is deepening at 3,655 feet. The Orange Petroleum Co.'s No. 1 Williams is at 4,345 feet. No. 12 Chesson is around 4,765 feet and No. 1 Berwick at 3,135 feet.

Other Pools

On the southeast side of the Spindletop Pool, the Yount-Lee Oil Co.'s No. 5 McFaddin is around 655 feet. No. 4 Gladys, on the northwest side, is at 345 feet. In the old section, the Baker Oil Co.'s No. 15 Trembly is at 975 feet. The Unity Oil Co.'s No. 44 National is around 875 feet. Porch & Telshaw's No. 3 Trembly is at 344 feet. O. Barber's No. 1 Garrick is at 434 feet. The Seven Oil Co.'s No. 1 Trembly is rigging.

At Batson, the Gulf Production Co.'s No. 167 Wing is drilling at 935 feet. No. 60 Choate is rigging. The Sterling Oil Co.'s No. 4 Hooks is at 1,615 feet. The Capitol Oil Co.'s No. 4 Hodges is drilling at 3,675 feet and No. 5 is idle.

In the Sour Lake Pool, the Humphrey corporation's No. 3 Griffith is around 3,345 feet. The Minor Oil Co.'s No. 77 fee is drilling at 565 feet. The Peveto Oil Co.'s No. 12 Carpenter is drilling at 935 feet.

In the Saratoga Pool, the Regna Oil Co.'s No. 1 Petty is at 995 feet. The Rio Bravo Oil Co.'s No. 5 Fountain is fishing at 3,860 feet and No. 47 Cotton is drilling about 765 feet.

At High Island, the Gulf Production Co.'s No. 5 Smith is drilling about 3,308 feet. The Sun Oil Co.'s No. 8-C Cade is around 3,040 feet and No. 10 Cade below 3,165 feet, with No. 8 Lockhart at 906 feet.

The Texas Company is sidetracking No. 22 Arnold, in the West Columbia Pool, at 3,090 feet.

In the Markham Pool, the Rycade Petroleum Corp.'s No. 1 Kountz is drilling around 4,200 feet.

In the Edgerly (La.) Pool, the Gulf Refining Co.'s No. 31 Bright-Penn is working over at 2,675 feet. The Rex Oil Co.'s No. 2 Hunter is drilling around 3,000 feet and the Green Oil Co.'s No. 7 Moore is drilling deeper at 2,875 feet.

In the Jennings (La.) Pool, the Gulf Refining Co. of Louisiana is deepening No. 1 Jennings-Clement. Myers and others' No. 1 Zigler is sidetracking. The Utropal Oil Co.'s No. 1 Clement is drilling at 2,206 feet. The Coastal Oil & Fuel Co.'s No. 91 fee is sidetracking at 1,415 feet. The General Petroleum Co.'s No. 6 Fontenot is idle at 2,125 feet. The Texas Company's No. 1-C Latrielle is at 3,695 feet and No. 95 Latrielle is around 1,875 feet.

Coastal Wildcats

In Brazoria County, the Roxana Petroleum Corp. has a location for No. 2 Kropp at Hinkle Ferry and is reaming No. 2 Allen at 2,700 feet.

In Fort Bend County, the Gulf company's No. 8 Davis at Long Point is drilling around 3,700 feet. A location has been made for No. 11. Same company's No. 6 Moore at Orchard is drilling below 3,180 feet. Neilan, Inc., No. 2 Fredericks is standing idle.

In Harris County, Miller and others' No. 2 Miller, Peggy Lake, is drilling around 2,450 feet. Brane Oil Co. has a location north of Spring. The seismo-

graph and torsional balance are being used on tracts around Seabrook and Kemah.

In Matagorda County, Gulf Production Co.'s No. 4 Craig is around 2,765 feet and No. 1 Sanborn at 554 feet.

In Jefferson County, Gulf Production Co.'s No. 1 Burrell at Fannette Dome is drilling around 4,300 feet and No. 2 Bordages below 2,700 feet. The Houston Oil Co.'s No. 1 Pipkin-Davis at Big Hill is around 2,345 feet.

In Wharton County, Sorelle's No. 1 Glena Flora is below 1,165 feet. Houston-Gulf Gas Co.'s No. 1 Woodbin is at 765 feet. J. W. Rich's No. 2 Dennis is idle.

In Live Oak County gas section, the Houston Oil Co.'s No. 1 Neuces River bed is around 1,600 feet. No. 16 Cartwright is drilling. The company has proven up about 6 square miles of gas territory. The test in the river bed is on the extreme south side and that on the Cartwright is on the extreme southwest.

N. LOUISIANA-ARKANSAS

(Continued from Page 50)

making 18 bbls. on the pump. Surface casing was set at 100 feet at Gorden and associates' No. 1 Jones, Section 36-15-20, and the test is drilling at 1,800 feet. Haynesville Trust Co.'s No. 1 Wingfield, Section 18-19-19, is going through gumbo at 1,150 feet. Hude & Aarnes' No. 2 Brown, Section 13-15-30, is coring at 3,302 feet. Scott Phillips has a derrick up for No. 2 Davis, NE NW, Section 6-18-20.

Arkansas Wildcats

In Calhoun County, Magnolia Petroleum Co.'s No. 1 Calion Lumber Co., Section 29-15-14, is drilling in sandy shale at 4,415 feet and the Southern C. O. P. Co.'s No. 1 Calion Lumber Co., Section 1-16-14, is drilling at 1,385 feet.

In Clark County, Virgil Heath's No. 1 Arnold, Section 12-9-20, is drilling at 818 feet and Whelen Oil Co.'s No. 1 Brown, Section 35-10-20 is waiting for cement to set at 2,300 feet.

Haley and associates' Cleveland County test, No. 1 Moore, Section 29-9-10, is drilling at 1,920 feet.

Decem Oil Co.'s No. 1 Hensley, Jefferson County, is drilling in sandy lime at 2,478 feet.

In Little River County, Mellick Oil Co.'s No. 1 Hawkins, Section 10-11-31, is drilling at 1,370 feet.

In Miller County, Lenze and associates' No. 1 Dale, Section 25-15-26, is drilling at 1,800 feet.

Arkansas Fuel Oil Co. is building derricks for two tests in Lafayette County, No. 4 Red River, SW SE NW, Section 18-19-24, and No. 3 Allen, NE NE SW, Section 18-19-24.

LaSalle Parish

In comparison with other weeks, Urania's new production was not up to par. Its 14 new wells were completed with a combined production of 1,485 bbls. Two were completed by the J. S. Abercrombie Co. on the King lease, Section 25-10-1e. No. 4 had the sand at 1,542-47 feet and is flowing 50 bbls. daily and No. 6 is making 80 bbls. naturally from sand at 1,542-48 feet. Arizola Petroleum Co.'s No. 3 Tannehill, Section 36-10-1e, is flowing 200 bbls. daily from sand at 1,546-50 feet. Beckman and associates' No. 7 Urania, Section 25-10-1e, is pumping 75 bbls. daily at 1,558 feet. Hunt and associates' No. 1 State, Section 26-10-1e, is making 100 bbls. naturally from sand at 1,481-87 feet and their No. 9 Tullos heirs, Section 26-10-1e, is making 80 bbls. on the pump from sand at 1,492-99 feet.

Kimbrough & Willis' No. 1 fee, Section 26-10-1e, was completed at 1,555 feet for a 60-bbl. pumper. Natural Gas & Fuel Co.'s No. 1-B T. Russell, Section 26-10-1e, is flowing 75 bbls. from sand at 1,546-53 feet. On its H. Tullos lease, Section 26-10-1e, Natural Gas & Fuel Co.'s No. 1 is pumping 100 bbls., 20 per cent salt water, from sand at 1,491 feet; No. 2 is making 65 bbls., 10 per cent salt water, from sand at 1,485 feet and No. 6 is flowing 50 bbls. from sand at 1,482-86 feet. Same company's No. 1-B Urania, Section 18-10-2e, is flowing 100 bbls. daily from sand at 1,517-21 feet. Roberts and associates' No. 4 Russell, Section 25-10-1e, is flowing 150 bbls. from 6 feet of sand topped at 1,525 feet. The best completion of the week was Sterling, Inc.'s No. 1 Wimbley, Section 18-10-2e, which is flowing 300 bbls. of oil from 2 feet of sand topped at 1,512 feet.

Abercrombie's No. 9 King, Section 25-10-1e, is coring at 1,498 feet. Arizola Petroleum Co.'s No. 4 Tannehill, Section 36-10-1e, which blew out at 1,527 feet making 5,000,000 feet of gas and 5,000 bbls. of salt water, at 1,527 feet, is still running wild. Arizola's No. 5 Tannehill is being rigged up and the surface casing was set at 101 feet at No. 6. Six-inch casing was lowered to 1,510 feet at B. & B. Drilling Co.'s No. 2 Urania, Section 7-10-2e. Six-inch casing was set at 1,534 feet at W. H. Burckhartt's No. 1 Smith, Section 26-10-1e.

Urania Drilling

Cherokee Petroleum Co.'s No. 2 Louisiana Central, NE NE SE, Section 19-11-3e, is a derrick. O. W. Clark's No. 3 Tullos, Section 23-10-1e, tested dry at 1,473 feet and is to be deepened. Cox and associates' No. 1 fee, Section 26-10-1e, is drilling at 800 feet. Daniels and associates' No. 2 H. Tullos, Section 25-10-1e, is drilling at 600 feet. Surface casing was set at 103 feet at Degman & Youngblood's No. 1 Hardtner-Tennehill, Section 8-10-2e. Dixie Oil Co.'s No. 6 Urania, SW SE SE, Section 24-10-1e, is a derrick. Explorers Oil Corp.'s No. 2 King, formerly Keith, Section 36-10-1e, is a rig. Hamilton & Musick are rigging up in Lot 5, Block 15, Section 26-10-1e, for No. 2 Volk. A. E. Hudson's No. 3 Urania, Section 7-10-2e, is drilling at 1,100 feet.

Hunt and associates' No. 6 Tullos heirs, Section 26-10-1e, is drilling below the 650-foot level and 6-inch casing was cemented at 1,482 feet at No. 8. Hunt, McCurry & Zoder's No. 2 Winberry, Section 18-10-2e, is drilling at 200 feet. S. S. Hunter's No. 2 Louisiana Central, Section 27-10-2e, is shut down at 1,687 feet. Six-inch casing was set at 1,549 feet at Jones and associates' No. 1 Norrid, Section 25-10-1e. Keene & Woolfe cemented the 6-inch at 1,526 feet at No. 3 Urania, Section 19-10-2e. Eight-inch casing was cemented at 950 feet at Louisiana Oil & Refining Corp.'s No. 31-B Tremont, Section 25-10-1e. McWilliams & Foster's No. 2 Russell, Section 25-10-1e, is drilling at 1,520 feet. Minnesota Oil Corp.'s No. 1 J. M. Cotton, Section 25-9-2e, cored dry brown sand at 1,535 feet.

On the Urania "B" lease, Section 18-10-2e, Natural Gas & Fuel Co.'s No. 2, NE cor., is a derrick; No. 3 is drilling at 200 feet and No. 4, NW cor. SE NE, is a derrick. A derrick is standing for the Natural Gas & Fuel Co.'s No. 1-E Urania, NE cor. SW NE, Section 18-10-2e, and 6⅝-inch casing was cemented at 1,474 feet at its No. 7 H. Tullos, Section 26-10-1e. Nelson and associates' No. 1 Bryant and Harvey, Section 26-10-1e, is waiting for a standard rig at 1,554 feet. Ohio Oil Co.'s No. 7 Urania, Section 16-10-12e, is being bailed to test sand at 1,513-17 feet. A derrick is standing for Ohio's No. 8, SE NE NE, Section 16-10-13. Six-inch casing was cemented at 1,532 feet at Roberts and associates' No. 5 Russell, Section 25-10-1e, and No. 6 Russell is drilling below the 350-foot level.

Six-inch casing was cemented at 1,522 feet at Sherman and associates' No. 2 Russell, Section 25-10-1e, and the same operators' No. 3 Russell is drilling below the 850-foot level. Standard Oil Co. set the 6-inch casing at 1,541 feet at No. 6 Urania, Section 13-10-1e. W. & H. Oil Co.'s No. 1 King, Section 36-10-1e, is coring a salty sand at 1,538 feet. Surface casing was set at 103 feet at O. F. Whittaker's No. 3 King, Section 36-10-1e. Williams Drilling Co.'s No. 4 Herbert, Section 26-10-1e, had the sand at 1,530-39 feet and is fishing for the swab. No. 5 Herbert on the same lease is drilling below the 1,500-foot level and a derrick has been built for No. 6 in Lot 5, Block 3, of the same section. Yeary & Bristol set 6-inch at 1,506 feet and have set the screen to test sand at 1,513-15 feet at No. 1 Urania, Section 8-10-2e.

Bossier Parish

The only completion in Bossier Parish during the week was the Woodley & Collins wildcat test, No. 1 Kilburn, Section 18-19-13, which was abandoned at 2,655 feet. Arkansas Fuel Oil Co.'s No. 1 Murray, Section 14-23-14, is still drilling in shale at 3,200 feet. Palmer Corporation's No. 10 Caplis, Section 25-16-12, is being bailed to test at 1,553 feet. A short string of 4½-inch casing was set at 1,238 feet at Square Deal Oil Co.'s No. 1 Hale & Rumbough, Section 17-18-11. When tested a show of oil was found with salt water and arrangements are being made to reset the packer at 1,238 feet. Woodley & Collins are fishing for slips at 1,300 feet at No. L. & AA Oil Co., Section 14-23-12.

Caddo Parish

The Gulf Refining Co.'s Ferry Lake lease came through with another good well during the week when No. 230, Section 16-20-16, was completed at 2,264 feet, flowing 425 bbls. of oil daily. Gulf's No. 222 Ferry Lake, same section, was plugged back from 2,590 feet to 2,260 feet and a 5-bbl. well saved. Dixie Oil Co.'s No. 74 Robertshaw, Section 14-21-15, was completed at 1,700 feet for a 25-bbl. pumper. The Texas Company's No. 60 Levee Board, Section 33-21-16, was completed for a 40-bbl. pumper at 1,828 feet. Standard Oil Co.'s No. 176 Stiles, Section 27-21-16, was abandoned at 2,426 feet.

Arkansas Natural Gas Co.'s No. 1 C. W. Lane, Section 13-21-15, is on top of a sand encountered at 3,607 feet and is running the 6⅝-inch casing to make a test. W. D. Chew's No. 3 State, Section 34-21-16, is drilling at 1,820 feet. Dixie Oil Co.'s No. 1 Jolly, Section 27-22-15, passed the 4,000-foot level and is grinding through lime and shale at 4,004 feet. While running the 8-inch casing to set at 3,613 feet at Dixie's No. 71 Robertshaw, Section 14-21-15, the string of pipe stuck at 2,800 feet. Dixie's No. 5 Worley, Section 23-22-15, is drilling at 980 feet. Gilliam Syndicate's No. 1 Sellington, Section 17-21-14, is drilling at 800 feet.

Gulf Refining Co.'s No. 1 J. M. Byrd, Section 2-19-14, is being bailed to test 4 feet of the Nacatoch sand topped at 964 feet. Six and five-eighths inch casing was cemented at 2,150 feet at Gulf's No. 5-U L. B. Caddo, Section 9-20-16. Gulf's No. 231 Ferry, Lake, Section 22-20-16, is drilling in blue shale at 149 feet and surface casing was cemented at 160 feet at No. 232 Ferry Lake, Section 15-20-16. A rig is up for Gulf's No. 233 Ferry Lake, Section 16-20-16, and location has been made for No. 234 Ferry Lake. Gulf's No. 17 Lane, Section 13-21-15, is boring through hard shale at 3,692 feet and No. 1-E Muslow, Section 35-21-15, is drilling through broken lime and blue shale at 3,192 feet.

Gulf's No. 12 Tyson, Section 14-21-15, is drilling in gummy lime at 3,492 feet. High water forced a shut down at 2,911 feet at Magnolia Petroleum Co.'s No. 1 Spell, Section 29-21-15. Magnolia's No. 1 Wiley Bradford, Section 24-21-15, is drilling in shale and lime at 2,580 feet. McGoldrich and associates' No. 8 Murray, Section 14-21-15, is drilling at 400 feet. Ohio Oil Co.'s No. 1 Ardis, Section 1-21-15, the deepest test drilling in Caddo, cored red and white lime at 4,267 feet. Ohio's No. 18 Smith, Section 12-21-15, is being reamed to the bottom at 3,870 feet and No. 19 Smith is drilling in chalk rock at 1,527 feet with a show of oil. Oil City Oil Co.'s No. 2 Satterwhite, Section 10-20-16, is drilling at 2,000 feet. The cement plug is being drilled out at 3,437 feet at The Texas Company's No. 42 C. M. L. Co., Section 23-21-15, and No. 47 on the same lease is drilling in hard lime at 2,337 feet. The Texas Company has made location for No. 2-B Jeems Bayou, 930 feet south and 875 feet west, NE cor. Section 16-20-16, and cemented the 4½-inch casing at 1,845 feet at No. 2 Harrell, Section 12-21-16. No. 57 Harrell is being bailed to test at 2,377 feet. The Texas Company's No. 4 Mason fee, Section 33-21-16, is a location and Tholl Oil Co.'s No. 8 Huckaby, Section 14-21-15, is drilling at 600 feet.

DeSoto Parish

Dixie Oil Co.'s No. 1 Jenkins, Section 9-12-11, is drilling through broken lime at 3,800 feet. Magnolia Petroleum Co.'s No. 1 Bond, Section 27-12-11, is drilling at 2,723 feet. Ohio Oil Co.'s No. 1 Cody, Section 34-12-16, is drilling below the 2,000-foot level. The derrick for A. H. Tarver's No. 4 Matthews, Section 29-12-11, was blown down and is being rebuilt. The Texas Company's No. 10-A Wemple, Section 2-12-12, is being bailed to test at 2,396 feet. L. V. Ulrey's No. 1 Heard, Section 18-12-12, is drilling in chalk rock at 1,624 feet. The derrick was blown down at J. C. Walton's No. 1 Caffraix, Section 36-12-11, and is being rebuilt. Walton's No. 2 Harp, Section 36-12-11, is a derrick pattern.

Monroe District

In Moorehouse Parish, Boisseau and associates' No. 1 Sullivan, Section 11-21-7e, is flowing salt water from 2,545 feet and one joint of drilling stem is stuck in the hole. Natural Gas Producing Co.'s No. 18 Crossett, Section 27-23-5e, is waiting for the 8-inch casing to set at 2,390 feet.

In Ouachita Parish, Central Company cemented the 6-inch at 2,117 feet at No. 1 Cole, Section 35-20-4e. G. E. Jordan's No. 1 Ouachita, Section 17-18-14e, is drilling at 1,850 feet. Six-inch casing was cemented at 2,128 feet at Palmer Corporation's No. 2 Kate Cole, Section 26-20-4e. Drilling operations are being delayed at Palmer Corporation's No. 2 fee, Section 24-19-4e, while the drilling stem is being fished out of the hole at 2,035 feet. Pioneer Oil & Gas Co.'s No. 1 Nolan, Section 17-18-14e, is drilling at 850 feet. Southern Carbon Co.'s No. 48 fee, 1,400 feet south and 640 feet west, NE cor. Section 35-19-4e, is drilling.

Webster Parish

Six and five-eights inch casing was cemented at 2,538 feet at Alabama Petroleum Co.'s No. 3-B Robbins, Section 21-21-10. Location has been made in the NE NE SW, Section 21-21-10, for No. 4-B Robbins. Gulf Refining Co.'s No. 2 Doyle, Section 21-21-10, is fishing for casing at 2,492 feet. Louisiana Oil & Refining Corp.'s No. 4 Crichton, Section 21-21-10, is drilling at 2,000 feet. Magnolia's No. 1 Bible, Section 8-20-9, is still milling on the bit at 4,281 feet. Surface casing was set at 323 feet at Magnolia's No. 1 Turner, Section 21-21-10, and the test is drilling at 500 feet.

Ohio Oil Co.'s No. 1 W. Cox, Section 23-21-10, on its way to the Trinity sand is nearing the 5,000-foot level and is drilling through lime at 4,887 feet. Ohio's No. 3 Holloway, Section 23-21-10, is drilling in lime at 1,684 feet. Smitherman & McDonald's No. 1 Oakley, Section 29-33-11, failed to get an oil showing along with salt water at 3,063 feet and the test is being plugged back to gas strata encountered around the 2,700-foot level. Southern C. O. P. Co.'s No. 1 Munn, Section 1-22-10, is a rig.

Scattered Wildcats

In Caldwell Parish, Charles Daniel's No. 1 Lively, Section 6-12-4e, is shut down at 1,090 feet. Cherokee Petroleum Co.'s No. 1 Louisiana Central, NW NE SW, Section 10-11-2e, is a derrick. Grant & Pipes' No. 1 Cruse, Section 6-11-4e, is drilling at 930 feet. Standard Drilling Co.'s No. 1 Cruse, Section 30-11-4e, is rigging. In Claiborne Parish, Gilliland Oil Co.'s No. 1-D Taylor, Section 14-23-8 is shut down at 2,650 feet waiting for casing. Triangle Drilling Co.'s No. 1 Hollyfield, Section 32-23-5, is drilling at 700 feet. Triangle's No. 1 Keen, Section 7-19-5, is drilling at 4,067 feet. Brown and associates have a derrick pattern built for No. 1 Beard, NW cor. SW SE, Section 28-19-5.

In Grant Parish, Dowling & McCurry's No. 1 Swope, Section 18-19-1e, was completed in sand at 1,612-16 feet and is flowing 300 bbls. of salt water and 5 bbls. of oil. The oil tested 20.7 gravity. Finn and associates' No. 5 Ball & Cody, Section 13-8-1w, is drilling at 1,900 feet. Finn & Hurdley's No. 1 Ball, Section 32-7-1w, is drilling at 1,900 feet. Finn & Hurdley's No. 1 Ball, Section 32-7-1w, is drilling at 350 feet. In Lincoln Parish,

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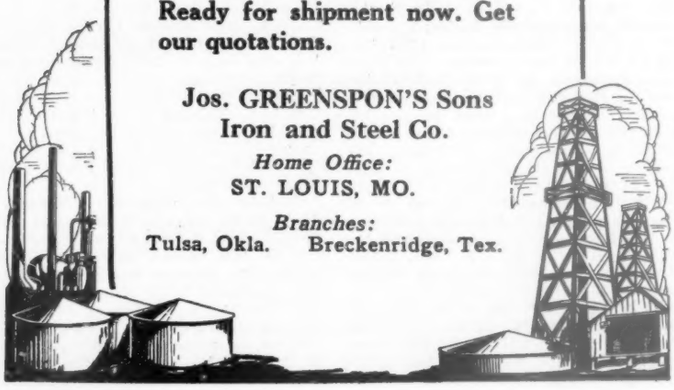

Buckley & Palmer's No. 1 Davis, Section 12-20-3w, is shut down at 1,985 feet for fuel. The Texas Company's No. 1 Tremont, Section 27-18-1w, is drilling in hard lime at 3,052 feet. J. F. Palmer has built a derrick for No. 1 Edenborn, 2,240 feet west and 1,320 feet south, NE cor. Section 4-11-6, Natchitoches Parish. In Red River Parish, Carnahan & Kyle's No. 1 Hollingsworth, Section 24-12-11, is shut down at 920 feet waiting for casing. In Sabine Parish, L. M. Emlet's No. 5 H. L. Bowman, Section 9-7-12, is drilling at 3,446 feet and No. 7 Bowman, Section 14-7-14, is drilling at 600 feet. In Union Parish, Arkansas Fuel Oil Co.'s No. 1 James Reeves, Section 14-20-1e, is waiting for the 8¼-inch casing to set at 3,185 feet. Clark Creek Oil Co.'s No. 1 Frost Johnson, Section 18-23-1e, cored sandy shale at 2,237 feet. In Winn Parish Cherokee Petroleum Co. abandoned the location for No. 1 Louisiana Central, Section 12-11-2w. Same operators have shut down at 1,531 feet at No. 1 Urania, Section 13-11-1e. C. H. Wilson's No. 1 Louisiana Central, Section 24-13-1e, is drilling at 500 feet.

MEXICAN FIELDS

(Continued from Page 50)

the San Felipe at 1,260 feet. Cia Explortadors de Riquezas Naturales' No. 1 Buena Vista has drilled plug from 8-inch cemented at 1,437 feet in gray lime and its No. 4 is in shale at 610 feet.

In Cacalilao

In the Cacalilao district of the northern fields, consider the following: La Corona Petroleum Co.'s No. 179, Lot 4 is in the San Felipe at 1,925 feet. International Petroleum Co.'s No. 266, Lot 5, is in gray lime at 2,025 feet, and its No. 269, same, is in gray shale at 302 feet. Mexican Sinclair Petroleum Corp.'s No. 98, Lot 2 Cacalilao is in green lime at 1,320 feet. Transcontinental Petroleum Co.'s operations in Lot 4 follow: No. 247 is 150 feet in shale; No. 253 is 2,215 feet in lime; No. 260 has cemented 8-inch in the San Felipe at 1,285 feet; No. 270 has done the same at 1,200 feet, and in the Paciencia, just north of Lot 4, No. 57 there is in the San Felipe with the hole full of oil at 1,630 feet.

At Ebano

In the Ebano district, Mexican Petroleum Co.'s operations follow: In the Chijol, No. 52 is in gray lime at 1,250 feet; No. 53 is in the same formation at 1,575 feet; No. 54 has cemented 10-inch at 1,130 feet in gray lime; No. 55 is in a similar formation at 1,500 feet. In its La Dicha the following obtains: No. 60 is in gray lime at 2,023 feet; Nos. 73 and 75 are each in gray lime at 1,185 and 1,861 feet, respectively; No. 99 is in gray shale at 375 feet; No. 100 is in blue shale at 700 feet and No. 101 is in gray shale at 85 feet. In its Midway, No. 9 is fishing at 705 feet in gray lime; Nos. 13 and 23 are each in gray lime at 1,740 and 1,430 feet, respectively. In its San Pedro, No. 20 is in brown lime at 2,005 feet; No. 21 is in gray shale at 260 feet; and its No. 12-A La Pez is in shells at 1,245 feet and its No. 10 Mendez has cemented 8-inch in gray lime at 1,242 feet.

In the South Fields

In the south fields, Huasteca Petroleum Co.'s No. 71 Cerro Azul is in hard gray lime at 2,348 feet; No. 74 is in blue shale at 335 feet, and No. 78 is rigging. In Tierra Blanca, its No. 60 is in hard gray lime at 2,090 feet; No. 67 is in a similar formation at 2,135 feet; No. 68 is brown shale at 1,185 feet, and derricks are up for several more tests. In Chapopote, No. 12 is in blue shale at 1,983 feet. Mexican Eagle Oil Co.'s No. 18 San Geronimo is in gray shale at 1,440 feet; No. 1, Lot 2, Escobal is in sandy rock at 3,049 feet; No. 43 Cerro Veijo is in gray shale at 600 feet, and its No. 11, Lot 148 Amatlan is in shells at 2,100 feet. Cortez Oil Corp.'s No. 2 Cahuayotes is in gray shale at 2,100 feet. Cortez Oil Corp.'s No. 2 Cahuayotes is in grey shale at 2,485 feet. Cosmos Oil Co.'s No. 130, Lot 17 Zacamixtle is rigging, and its No. 131 Lot 16, is drilling in shale at 375 feet. Agwi Companies' No. 41 Laguna de Tamiahua, is in sticky shale at 915 feet.

The interesting wildcat of the northern miscellaneous group at this time is India Oil Co.'s No. 1 Rayon, north of the Tamesi River and, to speak generally, say north of Ebano. This test has cleaned out the heavy asphaltic stuff that was worrying it at 1,200 feet, and is now drilling at 1,270 feet in the San Felipe. The India company is a local concern, and the active men in it are John ("Slim") Culbertson and "Happy" Halliday, both well known to the oil fraternity.

In Los Esteros, American International Petroleum Co.'s No. 26 is in white lime at 2,383 feet, and its No. 27 is in shale at 735 feet.

In the Corcovado district, La Corona Petroleum Co.'s No. 21, Lot 6 is in the San Felipe with a showing at 1,665 feet; its No. 23, same, is in shale at 1,010 feet. Mexican Sinclair Petroleum Corp.'s No. 13, Lot 1, Garruche (Corcovado) is in gray shale at 925 feet. Mexican Gulf Oil Co.'s No. 37 Chapacao is in gray and brown lime at 1,490 feet; its No. 38 is in white lime at 2,939 feet; its No. 39 is in gray lime at 1,035 feet, and No. 41 is a derrick. Rich Mex Oil Co.'s No. 6, Lot D Corcovado, has spudded.

In Topila, La Corona Petroleum Co.'s No. 21 is spudding. Ita Mex Oil Co.'s No. 22 La Mula is in gray lime at 2,340 feet. Cochrane and others' No. 10 Pac. de Agua, has cemented 8-inch in the San Felipe at 1,640 feet. Moreno and others' No. 2, same sector, is preparing to cement 8-inch in a similar formation at 1,550 feet.

In the Marland Field, Cia. Pet. Franco Espanola's No. 45 Limon is in gray lime at 1,735 feet; its No. 49 is fishing at 2,080 feet; No. 51 has shut down for orders in lime at 2,200 feet; No. 53 is rigging, and No. 56 is in shale at 600 feet.

National Lines' right-of-way tests in the Chapacao, Ebano district, follow: No. 35 is in gray shale at 675 feet; No. 40 is in shells at 1,230 feet. Lines' No. 36 Topila (Federal zone) is in shale and shells at 1,410 feet, and the No. 47 Tanchicuin has cemented 8-inch in shells at 1,300 feet.

KANSAS FIELDS

(Continued from Page 41)

feet and made 100 bbls. after a shot of 150 quarts.

Empire Gas & Fuel Co.'s No. 16, NW cor. NW, Section 36-27-4, is dry and abandoned at 2,680 feet. Neelly Oil & Gas Co.'s No. 1, SW cor. NE, Section 33-27-5, is drilling at 975 feet.

In the South Augusta district, Smith, Ash and others have spudded No. 1, SE cor. SW SE, Section 34-29-4. Magnolia Petroleum Co. has a rig on the ground for No. 1 Cotton, SW cor. SW, Section 16-28-6. Phillips Petroleum Co. has the rig up for No. 1 Pettit, SE cor. SE, Section 17-28-6. Marland Oil Co.'s No. 1, SW cor. NW NE, Section 9-28-7, is dry and abandoned at 3,330 feet. Flack and others' No. 1, SW cor. SW, Section 4-29-6, is dry and abandoned at 2,915 feet. H. Gardner's No. 1, NW cor. NW, Section 23-29-6, is dry and abandoned at 3,280 feet.

Greenwood County

Mid-Kansas Oil & Gas Co. has a rig on the ground for No. 18 Ladd Account, CSL SE, Section 19-25-9, and for No. 9 Ladd Account, CWL NW NW NW, Section 20-25-9.

Gillespie and others have a dry hole in No. 1, SE cor. NE SE, Section 23-27-9 at 2,333 feet.

Chase County

Skelly Oil Co. has rigged up No. 1 Eastman, NE cor. SE, Section 24-22-8. Tom Conway's No. 1, NE cor. SE, Section 9-23-9, had sand 2,521-44 feet and made 12 bbls. of oil and 12 bbls. of water after a shot of 60 quarts. Phillips Petroleum Co. has the rig up for No. 6 Teeter, SE cor. SW SW, Section 15-23-9. Empire Gas & Fuel Co.'s No. 33, NE cor. SW, Section 16-23-9, had sand 2,479-2,544 feet and made 100 bbls. after a shot of 200 quarts. White Eagle Oil Co.'s No. 6, CSL NE NW SE, Section 19-23-9, had sand 2,564-2,604 feet and

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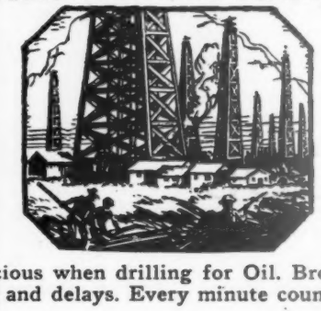

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made 175 bbls. after a shot of 100 quarts: the rig is on the ground for No. 7 Morris, SE cor. NW SE, Section 19-23-9.

Harvey County

Watchorn Oil & Gas Co. is drilling at 1,250 feet in No. 1 Symons. SE cor. SE, Section 27-22-2.

Marion County

Ray Gear and others have rigged up No. 1 Wiley, SE cor. SW, Section 33-20-5. Prairie Oil & Gas Co. has rigged up No. 17 Jeffries, CEL NE SE SW, Section 17-21-5.

CANADIAN FIELDS

(Continued from Page 52)

tion 7-20-2w5, is running 10½-inch casing to 3,100 feet, and expects to resume drilling in a few days.

Home Oil Co., LSD 10, Section 2-19-2w5, has set 24-inch casing at 24 feet to shut off the water flow and the 23-inch casing at 40 feet, and is drilling at 75 feet. Dallas Oil Co., LSD 11, Section 20-19-2w5, spudded in last week, and at last reports had the 24-inch pipe down 35 feet. Great West Oil Co., SE Section 7-20-2w5, which recently spudded in, is reported down 180 feet and drilling a 20-inch hole. The big casing is set at 150 feet. This company is also starting a test on the Maughan leases in the Montana Field.

In Harder Formation

McLeod Oil Co.'s No. 2, LSD 16, Section 1-20-3w5, is reported down 3,580 feet and is drilling in a harder formation and apparently close to the Madison limestone. It is drilling an 8½-inch hole and will set casing on the top of the limestone and continue with a smaller hole.

Illinois-Alberta Oil & Refining Co.'s No. 1, LSD 14, Section 12-20-3w5, is shut down waiting for 4¾-inch casing, which is not expected to reach Okotoks for another week. No. 2 has been located a little south of No. 1 and work is being started while waiting for the casing for No. 1.

Vulcan Oils, Ltd., No. 1, LSD 11, Section 13-20-3w5, after running 500 feet of open hole with the casing hanging at 4,100 feet struck a small cave-in at 4,600 feet. The tools were pulled and the 6¾-inch casing run to 4,600 feet, and drilling resumed. The drill is working in a soft formation apparently close to the Madison limestone.

Advance Oil Co.'s No. 1, LSD 14, Section 20-19-2w5, is still trying to pull the 8¼-inch casing to underream to 3,160 feet. Advance No. 2, on the same section, is reported to have spudded in. New York-Alberta Oil Co. has located No. 1 well on the northwest corner of LSD 6, Section 20-19-2w5, and a heavy standard rig is being brought in for the test. Alert Oil Co. will drill on a 5-acre tract in LSD 7, Section 31-19-2w5. This is close to the unfinished Midwest No. 2 well. New Valley Oil Co. is working on a derrick in LSD 4, Section 6-20-2w5. Dolomite Oils, Ltd., has a location on LSD 1, Section 1-20-3w5, just south of McLeod No. 2. British Dominion No. 1, LSD 4, Section 5-20-2w5, is working on derrick, and is bringing in a heavy standard outfit for its test. Western Ridge Oil Co. has located its test in the NE LSD 1, Section 11-20-2w5, and is bringing in derrick timbers. Roy Widney will have charge of the drilling. New McDougal-Segur Exploration Co. has a location close by, in the NE Section 12-20-2w5. New Black Diamond No. 1, LSD 1, Section 3-20-3w5, is rigging up.

Belgo-Canadian Oils, Ltd., Section 4-19-2w5, is beginning work on the old Record well, drilled at the time of the Calgary boom to 4,327 feet depth. This test has at least two strings of tools at the bottom. The company has secured Angus McLellan, a driller of 25 years' experience in Australia, the United States and Canada, to take charge of the drilling, and the difficult fishing job before drilling can be actually started.

Border Field

In the Border Field, Imperial Oil, Ltd., Erickson Coulee, LSD 13, Section 8-1-12w4, has spudded in with rotary and at last reports was down 53 feet and drilling. Near Coutts, the Urban Oils, Ltd., Section 4-1-15w4, which has been shut down since the death of Field Manager Jaynes, is resuming in charge of John Brown. Casing will be run to 2,740 feet and drilling resumed. In the Foremost Field, United Oils, Ltd.'s No. 2 is reported down 210 feet and drilling. South of the Rogers-Imperial gasser, the Bell-Fey wildcat test in the Sweetgrass Hills of Montana has resumed drilling at approximately 600 feet depth. W. E. Burks, drilling contractor of Sunburst, and A. Beardslee and Fred Munger, the latter representing Detroit capital, are reported to have taken over the well and a block of acreage from F. M. Bell, who started the test.

Close to Sweetgrass, Mont., the Monalta Oils, Ltd., has spudded in with a standard outfit.

In the Irma area, the Edmonton-Wainwright Oils, Ltd., is down 600 feet with the Irma Oil Development Co. test on the LSD 16, Section 28-45-9w4, and drilling.

In the High River district, High Rivers Oilfields, Ltd., is bringing in timbers for a derrick.

Former shareholders of the Federal Oil Co. have secured some of the lapsed leases and are endeavoring to reorganize the company. The Federal Oil Co. at the time of the Calgary boom operated in territory east of Aldersyde, south of Calgary and considerably east of any other wells drilled at that time. The location was in the north half of Section 22-20-28w4, and work was suspended at 2,100 feet with a broken tool at the bottom of the hole. This area has been refiled, and some other leases secured, and the shareholders are planning after reorganization to complete the test.

Heavy filing has recently taken place along the Medicine River, west of Lacombe, Alt., where the Shallow Oil Co. is planning to develop a structure located in Township 42-4w5. It is claimed oil, if present, will be found around 1,000 feet. The nearest drilling previously was done at the time of the Calgary boom by the Alberta Associated Oilfields, Ltd., on a parallel structure near Rocky Mountain House.

A small gas flow was recently encountered at 545 feet depth in a test drilled for water by the village of Grassy Lake, Alberta, and a local syndicate is being formed to develop the gas production.

In northern Alberta, the Stewart Syndicate test in the Lesser Slave Lake area is expected to spud in about May 15.

Ontario Fields

In the Ontario fields, Union Natural Gas Co.'s No. 20 deep test in Dover Township, Kent County, has set the 6¾-inch casing on top of the Trenton limestone at 2,800 feet. In Zone Township, Kent County, the Colchester Oil & Gas Co.'s E. P. Rowe No. 1 deep test north of Thamesville is reported drilling nearly 400 feet in the Trenton limestone without a show.

In Norfolk County, Dominion Natural Gas Co.'s No. 12 in the Courtland Field, on the James Willett farm, NE Lot 17, Concession 3, Middleton Township, has finished a gasser, good for 85,000 feet a day. Dominion Natural Gas Co.'s No. 11 in the SW of Lot 19, Concession 14, North Walsingham Township, near Langton, finished a small gasser, less than 20,000 feet a day. Medina Natural Gas Co.'s No. 35 at Beech Lane finished a dry hole.

In Howard Township, Kent County, the shallow producer on the Fred Finningsdorf farm, Concession 12, has played out, after 33 years' production.

Alberta Leases

The announcement has been made that the minimum petroleum and natural gas acreage which may be leased or assigned under the regulations of the department of in the interior has been fixed at 20 acres. In the Turner Valley and Irma-Wainwright Fields many holdings have been sublet and assigned in small parcels, and in some cases in the former field at least the leases have been cut up into decidedly small tracts. The new provision applies only to leases granted by the Federal Government.

The oil man's cost cutting pipe-threader

the Rapiduction

cuts the time of threading—of changing die heads—of changing chasers. Cuts his cost of chasers and dies.

No need to change die heads for different sizes—one Williams Rapiduction Die Head covers the complete range of threading.

Many hours are saved in the course of a year's work. The unproductive labor of changing die heads is wiped off the cost sheet. You get 100% production.

SAVING IN CHASER COST: Only two sets of chasers needed to cover the complete range of the machine—and these are changed in a few seconds.

You can change or replace A SINGLE CHASER BIT with the Williams Rapiduction Die Head—instead of having to replace the entire set, 10 seconds time against 220 seconds; a saving of 3 minutes and 30 seconds.

Just multiply this by the number of changes made in a year, and you will get some idea of the time savings that are made by the Williams Rapiduction Pipe Machine.

YOU SAVE A LOT ON DIES

A complete set of dies covering the range from 2½-inch to 6-inch costs your plant only a fraction as much as with the old type of machine.

Besides, if you snip one die on an old type head, you have to replace the complete set or else stand the cost of recutting. With a Rapiduction Die Head you merely replace a single chaser bit.

DOES THREE TIMES THE WORK

You can pick up a 2½-in. pipe, chuck, set, thread, cut and ream—and then change over to, say, a 4-in. pipe, pick up the pipe, chuck, set, thread, cut and ream—in 2 MINUTES AND 20 SECONDS—

As compared with a total of 7 minutes and 6 seconds with the old type machines.

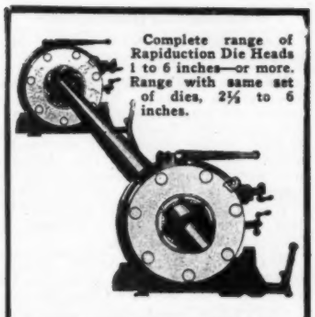
RIGID HEAD MEANS LONGER LIFE: You don't buy pipe threading equipment often—and when you do buy it, you want definite insurance of long productive life.

You want your machinery to be actively producing—not laid up for repairs, running up overhead charges.

Construction of the Rapiduction Die Head gives LONGER LIFE because the head is set rigidly. As you know, the whole burden of effort in a pipe threading machine comes on the die head. The Rapiduction's rigidity reduces the liability of side thrust or torque.

And the extra bearing surface in the die holder gives extra years of life—wears much more slowly, because there is hardly the slightest side thrust.

Write today for illustrated bulletin, giving you full details of the definite advantages of the Williams Rapiduction Power Pipe Machine.



Complete range of Rapiduction Die Heads 1 to 6 inches—or more. Range with same set of dies, 2½ to 6 inches.

The Williams Rapiduction Die Head covers the complete range of threading from 2¼ inches to 6 inches with the one set of chasers. First cost of dies is less; replacement costs are reduced; hours of time saved in changing over machine.

WILLIAMS RAPIDUCTION POWER PIPE MACHINE

WILLIAMS TOOL CORPORATION
Erie, Pa.

Rotary Fishing

The Jones Outside Down-Trip Drill Pipe Cutter

Offers a *safe* method of getting out of that "stuck" drill pipe job.

Write for further information.

General Oil Tool Company

KAMMERDINER ROTARY FISHING JARS AND THE JONES DRILL PIPE CUTTER

RENTAL and SERVICE

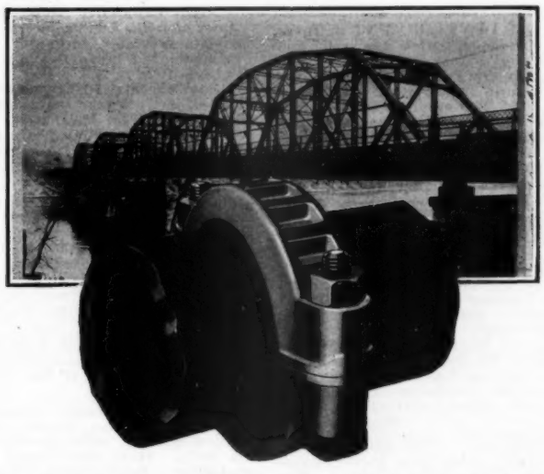
HOUSTON, TEXAS
J. C. Wadsworth
Hotel Cotton

HUMBLE, TEXAS
J. O. Headrick

TULSA, OKLA.
John Sherman
2-2798—2-6304

ELECTRA, TEXAS
Decker Tool & Supply Co.

PERRY, OKLA.
Vern Brown



Victaulic Pipe Line over Willimansett Bridge, Holyoke, Mass.

VICTAULIC

REG U S PAT OFF

FLEXIBLE LEAKTITE PIPE JOINTS

For Crude Oil, Natural Gas, Water, Compressed Air, etc., with steel, wrought or cast iron pipe.

Interchangeable by use of adapters with all standard pipe.

Send for descriptive matter, with complete information.

VICTAULIC COMPANY OF AMERICA

26 BROADWAY NEW YORK

35 CENTS a line first insertion; 25c a line each additional insertion. Cash in advance.

CLASSIFIED WANTS

CREATE AND BUILD BUSINESS

MAIL your advertisement now. It will be published next week. Cash with order.

LEASES—PRODUCTION

HARTLEY COUNTY leases. M. F. Beaumont, Hartley, Texas.

WILL LEASE three thousand acres in Angelina County, Texas. Five-year commercial lease with good geological report favorably located for shallow production. Other substantial concerns operating in this vicinity. One dollar per acre with 50 cents renewals, all or part. Address P. O. Box 265, Liberty, Texas.

WANTED TO LEASE land east Winfield $5 per acre. Jenny Turner, 1520 Broadway, Winfield, Kan.

FLORIDA OIL LEASES .near well drilling, 15,000 acres on structure, for a well. Box 653, Kansas City, Mo.

SETTLED production and drilling propositions. R. E. Cope, Bowling Green, Ky.

FOR LEASE—Garfield County, S½ NW¼, 21-20-3w, 80 acres. R. E. Baker, Box 427, Drumright, Okla.

WRITE for my state of Texas oil map free. Oil leases exclusively. Reference Mercantile Agencies.
C. W. WEBSTER
W. T. Waggoner Bldg.
Fort Worth, Tex.

WEST TEXAS — 47,000 acres, solid block, 35 cents, with annual rental of 25 cents per acre. Also other acreage located in Howard and Glasscock Counties. Six thousand acres solid block in Glasscock County for a well. R. L. Cock, Big Spring, Tex.

McCULLOCH COUNTY, Texas, just ahead of the play. Some attractive shallow acreage for sale. J. Meers, Brady, Tex.

NEW OIL DEVELOPMENT in Texas County, Oklahoma. One gas well, and six wells now drilling new locations and blocks nearly every week. Said to be the biggest wildcat in the state. Almost a wompus cat. The eyes of the world are on the Panhandle of Oklahoma and Texas. Send 25 cents for oil map showing locations of blocks and wells, and price list. Shows names of parties drilling and checkerboarding. The Guymon Land & Loan Co., Guymon, Okla.

DEEP TEST WELL NOW DRILLING IN NORTH FLORIDA

T. F. Bray and associates from Arkansas are now drilling a deep test well for oil and gas located on the Monticello Dome in Jefferson County, Florida. Send for structural and drainage map; also geological report.

Geology by Dr. S. T. Wisby of Little Rock, Ark. We desire to hear from all of those who are interested in purchasing leases and royalties around this well.
T. F. BRAY, TRUSTEE
Box 127 Monticello, Fla.

SOUTHEAST NEW MEXICO

Can furnish practically proven leases in Artesia Field, Eddy County. Also other tracts in Eddy, Chaves and Lea Counties. Particulars on request.
H. T. ORCUTT
1114 Colcord Bldg., Oklahoma City, Okla.

NEW MEXICO — Any part of 15,000 acres, San Juan and Rio Arriba Counties, Government permits. Want drilling contracts with reliable companies. Percentage or acreage basis. Good terms. Shallow drilling. Oil 66 Baume, 84 per cent gasoline. Proven structure. Four sands. Approved by high-class geologists. Acreage going rapidly. Write us for particulars. International Development Co., 1006 Patterson Bldg., Denver, Colo.

FOR SALE—Kiowa County, Kansas, leases. 8,720 acres, Township 30, Range 17w; 1,960 acres, Township 29 and 30, Range 16w. August H. Hoyer, R. R. 2, Canton, Kans.

GRANT COUNTY LEASES
Ranges 6, 7 and 8. Prices reasonable.
A. T. Williams, Wakita, Okla.

TEN-YEAR oil leases. No rentals. Crockett County, Texas. Send for true map. Paul Konz, Box 291, Fort Worth, Tex.

LEASES—PRODUCTION

FOR SALE — Easy terms or trade, can't look after it; 40-acre, lease 4 miles east of Copan, Okla.; in oil field; no dry hole; several offsets in 600 feet also Bartlesville sand. Air is working wonders; 1 Leidecker rig, one 6-horse engine and power, one Jones oil well reamer. Home in Nowata. Lock Box 599, Independence, Kans.

DRILLING FOR OIL IN FLORIDA

If you want some leases write W. C. Smith, Box D, S, 30, Fort Lauderdale, Fla. They may be worth real money later.

HAVE SEVERAL pieces of flush and settled production for sale in Oklahoma and Wichita Falls districts. Prices reasonable and terms can be arranged if necessary. P. O. Box 1144, Dallas, Tex.

HARTMAN & SARGENT — Leases, royalties, production, bought and sold, Dept. A. Geological and property management, Dept. B. You'll like our service. Office, Lawrenceville, Ill.

ONE HUNDRED BARRELS settled shallow production; two pipe lines cross lease; $2 barrel for oil. Twelve shallow locations left to drill and four deeper sands recently discovered, with only one well drilled to deeper sands. About half of shallow wells producing through 8 or 10-inch casing and can be deepened later. Ideal operating conditions, located North Louisiana-Arkansas territory, in very heart of best production and surrounded by big companies. Property will stand most rigid investigation and would be okeyed by geological department of most major companies. Will sell on very long terms with small cash payment. Balance from oil. Address Post Office Box 1477, Fort Worth, Tex.

GREAT PANHANDLE STRUCTURE EXTENDS INTO
UNION COUNTY, NEW MEXICO

Logs of wells drilling in Union County correlate favorably with wells drilled in Panhandle and prove this statement beyond question.

I am offering 10,000 acres checkerboarded, new, 5-year state leases, with renewal clause on Pasamonte structure; deep test already drilling. Chas. E. Parrott, Ketchum Hotel, Tulsa, Okla.

FOR SALE — Leases, production and partly developed leases. On account of shallow drilling, low cost of equipping, small operating cost, high gravity oil and long life production, Kentucky offers the best opportunity for the small investor. We have for sale producing properties with 2 to 100 bbls. daily production and large undeveloped acreage with proven locations to drill. Address W. P. Harley, Bowling Green, Ky.

HAVE BUYERS for flush or settled production in Oklahoma and North Texas. Vern R. Hartman, P. O. Box 442, Dallas, Tex.

FOR SALE—Leases, production and royalties in Barren County, Kentucky. Shallow drilling, high gravity oil, long life wells. Have some leases adjoining production. Small rentals. L. W. Preston, Glasgow, Ky.

FOR SALE—Small production, good equipment. Opportunity knocks. Write P. O. Box 185, Springfield, Tenn.

ROYALTIES—PRODUCTION

PRODUCING

Oil Royalties

All Southwestern Fields
Bought and Sold
Inquiries Invited

REAVES & CO.
P. O. Box 345

SAN ANTONIO, TEXAS

WANT TO BUY royalty production, in any amount, anywhere, in Mid-Continent Field. A. B. Hugo, Enid, Okla.

ROYALTIES—PRODUCTION

J. F. MARION COMPANY

Magnolia Building
Dallas, Texas
Buys and Sells
Texas Royalties
"Ask Us First"

TEXAS PANHANDLE

Royalties in large or small units to suit any size buyer in fastest growing and most rapid developing oil field in middle west. Write for list of offerings. B. O. Taylor, 306 Blackburn Bldg., Amarillo, Tex.

ADVERTISING RATES

	1 Time	2 Times	3 Times	1 Mo.
3 lines	1.05	1.80	2.55	3.30
4 lines	1.40	2.40	3.40	4.40
5 lines	1.75	3.00	4.25	5.50
6 lines	2.10	3.60	5.10	6.60
7 lines	2.45	4.20	5.95	7.70
8 lines	2.80	4.80	6.80	8.80
9 lines	3.15	5.40	7.65	9.90
10 lines	3.50	6.00	8.50	11.00

(Six words usually make a line.)

Compute white space at the above rates

Mail your advertisement to

THE OIL AND GAS JOURNAL
Tulsa, Oklahoma

WE BUY AND SELL producing oil royalties, both small and large interests. For listings write Hyland & Co., Kennedy Bldg., Tulsa, Okla.

EQUIPMENT WANTED

WE ARE in the market to buy two (2) second-hand pipe machines, one machine size from 2 to 10 or 12; and one size from 1 to 4. State make of machine, condition and price. Box B-284, The Oil and Gas Journal, Tulsa, Okla.

WANTED—One Standard rig or National machine No. 2, to be used in Mounds. Must be in good condition and worth the money. Box 283, Mounds, Okla. Phone 159.

FOR SALE—EQUIPMENT

FOR SALE

Fully equipped machine shop for oil country work, including buildings, 26 Bridgeford tool lathe, shaper, drill press, steam hammer, boiler, oil engine, No. 12 pipe machine, necessary cranes and small tools. Equipment new when installed at Gridley, Kan., 1923. For sale on account of ill health. For further information communicate with the Western Drill Tool & Supply Co., Chanute, Kan. Phone 480.

USED LINE PIPE FOR SALE
35,000 feet 2½-inch
50,000 feet 3 -inch
75,000 feet 4 -inch
50,000 feet 6 -inch

Two miles 60-pound first-quality relaying rails.

For immediate shipment from our Texas yards.

KEYSTONE PIPE & SUPPLY CO.
315 W. T. Waggoner Bldg.
Fort Worth, Texas.

ONE 25-H.P. Foos gas engine, practically new. Write for our list of new and used machinery. A. C. Love Co., Huntington, W. Va.

FOR SALE—EQUIPMENT

FOR SALE—Ingersoll-Rand A No. 1 Type direct connected steam driven compressor, size 24x16¼x30, in first class order. The Tower Gasoline Co., Oklahoma City, Okla.

THE SMALL SUM that it costs to insert an advertisement in the Classified Section of The Oil and Gas Journal enables you to place your desires in the minds of men who are always interested in a good proposition.

We buy and sell
Casing, Line Pipe and Supplies.
Let us figure with you.
LEE MORRISON SUPPLY CO.
Bartlesville, Oklahoma

DRILLING MACHINES FOR SALE

Machines and rigs ranging in sizes from No. 4 Keystone to Standard rigs for sale, also a large stock of drill tools of every size and description. Write or wire us for prices. Sewell Well Co., 1627 Locust St., St. Louis, Mo.

CRAGO CUT GEARS

Worthy of your confidence. General machine work. 1416 Walnut. Kansas City, Mo. Phone Harrison 7660.

I OUGHT to be able to sell equipment through this section. It must bring good results, because it is filled with Classified Advertisements every week. Guess I'll try it.

PATENT ATTORNEYS

REGISTERED PATENT ATTORNEYS
United States and Canada
Before disclosing your invention to anyone send for blank form
Evidence of Conception
Bulletin "How to Establish Your Rights" and complete information free.
LANCASTER AND ALLWINE
240 Ouray Bldg. Washington, D. C.

PATENT-SENSE — Valuable book (free) for inventors seeking largest deserved profits. References include prominent oil men. Write Lacey & Lacey, 718 F. St., Washington, D. C. Established 1869.

ORCHARDS AND FARM LANDS

TWO FEE ranches. M. F. Beaumont, Hartley, Tex.

READ THIS

For sale, 743 acres, nearly all level, rich valley land, 4 miles from Haskell, Tex., 500 acres in cultivation; three new houses; is in probable shallow oil territory. Has $8,000 farm loan at 6 per cent and $2,000 notes at 8 per cent against it. Price $60 per acre. $10,000 cash and the purchaser assume debt; would take $12,000 good trade. Balance in five annual payments, 7 per cent. A good buy. Write me for full information. P. D. Sanders, Haskell, Tex.

FOR SALE—DOGS

GERMAN SHEPHERD police puppies. High-class and low price. Bigheart Kennels, Caney, Kans.

FOR SALE—MAPS

FOR OIL FIELD MAPS
of Eddy and Lea Counties, New Mexico.
Write
SMOKE HOUSE
Artesia, New Mex.

McCULLOUGH COUNTY maps. One dollar each. The play has just started. Shallow area. J. Meers, Brady, Tex.

35 CENTS a line first insertion; 25c a line each additional insertion. Cash in advance.

CLASSIFIED WANTS

CREATE AND BUILD BUSINESS

MAIL your advertisement now. It will be published next week. Cash with order.

MONEY RAISING

DEPENDABLE FINANCING SERVICE
Results sure, swift, economical. Employ the One Great Plan—the plan that gets money. Avoid abortive "mail order" and "phony" broker schemes. Describe proposition. Hansel Financing Specialists. 212-GE Earlham St., Pittsburgh, Pa.

JAMES B. MURROW, INC.,
186 Joralemon Street
Brooklyn, N. Y.
Wholesalers. Retailers
of
Oil Securities

RAISE CAPITAL
Through the sale of securities in your corporation. Twenty-five years' experience behind plan.
NORTHCLIFFE CORPORATION
95 West 43rd St., New York, N. Y.

DO YOU NEED MONEY for organizing or financing oil or mining deals? Write 117 E. 10th, Oklahoma City, Okla.

POSITION WANTED

SUBSURFACE GEOLOGIST, thoroughly acquainted with all office work, accounting and production methods, age 33, married, now employed by big oil company, desires connection with some independent oil operator or smaller company on reasonable salary. College graduate, 12 years' experience in accounting, production and geological departments—last 4 years as subsurface geologist in production department. Can take charge of office if desired, handle all correspondence, take dictation, make all accounting and production reports, and work your subsurface geology both new and old. Are you interested in such a combination man for $225? Prefer employer with inclination to carry one for small interest in a number of good structures now available, and with sufficient capital to buy acreage that can be blocked, offset acreage sold and drilled with ultimate investment considerably reduced. Box B-287, The Oil and Gas Journal, Tulsa, Okla.

GEOLOGIST, university graduate; 10 years in field with major companies, desires connection with reliable oil company or operator. Box B-281, The Oil and Gas Journal, Tulsa, Okla.

A LAWYER of matured years, with oil country experience extending over a period of 20 years, with a working knowledge both of the Spanish language and the recently enacted petroleum laws of Mexico would like to affiliate with any dependable oil enterprise contemplating investments and developments of oil properties in Mexico or other Spanish-American countries. The best of references will be furnished. Box B-273, The Oil and Gas Journal, Tulsa, Okla.

A YOUNG MAN, age 30, with years of experience in abstracting, checking records and taxes wants position in land, leasing or legal department of large oil company with chance for advancement. Employed at present. Address Box B-280, The Oil and Gas Journal, Tulsa, Okla.

WANTED — Position as superintendent, manager, accountant, auditor, organizer, promoter, etc., by an experienced man, with a good knowledge of law and valuable connection at Washington, D. C. Can furnish bonds to any amount. Box B-272, The Oil and Gas Journal, Tulsa, Okla.

WANTED—Stenographic position. Six years oil work experience. Employed now but desire to make change June 1 or 15. Prefer location in Texas or Oklahoma. References furnished. Box B-271, The Oil and Gas Journal, Tulsa, Okla.

FIELD MANAGER — Several years' experience in charge of drilling and production. Trained in geology and petroleum engineering. Graduate engineer. Age 32. Excellent character and references. Box B-277, The Oil and Gas Journal, Tulsa, Okla.

SUBSURFACE correlation—Geologist experienced in sedimentary analysis of sands and with knowledge of microfossils, desires position. Three years graduate training. Box B-285, The Oil and Gas Journal, Tulsa, Okla.

RESULTS ARE WHAT COUNT

That's why Classified Advertisers write such letters as these:

"Please keep my ad going all the time, as it is bringing good results."

* * *

"I might add that I have already had eleven inquiries from parties desiring to sell Producing Royalties, which is most satisfactory when you consider that the ad has run only one time. Continue to run it until otherwise notified."

* * *

"Renew my ad for another month. Change it to read 2,000 acres instead of 6,000 acres, as I have sold 4,000 acres already."

* * *

Whenever you want to buy or sell production, equipment, royalties, leases, or service of any kind, use the Classified Section and you will get good results.

The OIL and GAS JOURNAL
TULSA, OKLA.

POSITION WANTED

22 YEARS' experience in new and old lease work as lease foreman and practical engineer. A specialty on old run-down production and leases. Can build your powers and equip them. A-1 reference. Box B-268, The Oil and Gas Journal, Tulsa, Okla.

MAN OF YEARS experience in production and lease work, wants lease to operate, on part oil and cash plan. A-1 reference. Box B-267, The Oil and Gas Journal, Tulsa, Okla.

REFINERY SUPERINTENDENT will be open for a position July 1 with a reliable firm. I have had 24 years' experience in construction and operation of modern refineries. I am at present employed in the operation of a 5,000-bbl. refinery with modern cracking plants in connection. Box B-253, The Oil and Gas Journal, Tulsa, Okla.

HELP WANTED

DRAFTSMEN — Experienced in refinery and general oil field layout and construction. Must be familiar with design as well as detail work. Experience and sample of work to accompany application. Chief Engineer, Empire Companies, Bartlesville, Okla.

EMPLOYERS SERVICE, Pioneer Trust Building, Kansas City, Mo., has listed positions for Chem. Engr., Ph.D., proficient in organic chem., ability to handle help, $225.00-$300.00. Const. Engr. Refinery exp., $240.00-$270.00. M. E. auto fuel testing exp., $175.00-$225.00. Chem. Engr. 2 to 3 years exp. research lab. work, organic and physical, $175.00-$225.00. Chem. Engr. or Chemist for semi-development work, $150.00-$250.00. Chemist, recent grad. or 6 mo. exp. some mechanical ability, $125.00-$175.00. M. E. grad. with refining exp., salary open.

MORE AVAILABLE

There are other good positions available in the oil industry.

Right now, executives are reading the "Position Wanted" Column hoping to find a man of your qualifications.

Mail your advertisement now for the next weeks issue so that they can get in touch with you.

BUSINESS OPPORTUNITY

YOU have your organization and can give good service. Does the Billion Dollar Petroleum Industry know it? Have you made it easy for oil men to order from you? If not, the surest and best way to promote the merits of your company is to use The Oil and Gas Journal—the oldest and best petroleum publication in the world.

FOR SALE—Complete absorption gasoline plant, daily capacity 10,000,000 cubic feet of gas; must be moved from premises in 90 days. The Tower Gasoline Co., Oklahoma City, Okla.

IT'S WORTH TRYING

During the year thousands of men use the Classified Wants Section to good advantage.

They use it to buy or sell leases, royalties, production, equipment or service of all kinds.

You can do the same thing.

Mail your advertisement now and it will be placed in next week's issue where more than 25,000 readers will have an opportunity to bid on your offering.

LEASE MAN, with lots of experience leasing, buying royalties and purchasing offset acreage, desires to correspond with major company. Best of reference. Box B-286, The Oil and Gas Journal, Tulsa, Okla.

GENERAL MANAGER WANTED—Have leased promising oil land; want capable man thoroughly acquainted with promoting and developing, must invest and give services for interest in company. An unusual opportunity. Address, Wedeman, 915 M. St., N. W., Washington, D. C.

BUSINESS OPPORTUNITY

PATENTS Nos. 1,562,690 and 1,542,864, covering Cracking Stills are for sale. Address inquiries to, Max F. DeBajligethy, 1219 Granger St., Houston, Tex.

A NEW MILLION-DOLLAR Nevada mining corporation with large lead-silver holdings wants exclusive agent to handle stock sales. Address Box 1581, Station C, Los Angeles, Calif.

REFRACTIVE INDEX LIQUIDS
Liquids of known refractive index for use with the microscope in examination and identification of sediments. Now in use by the major oil companies in the United States and abroad. For particulars address:
A. C. HAWKINS
40 Nunda Blvd. Rochester, N. Y.

TEN THOUSAND-ACRE BLOCK, ready for drilling contract, in Amarillo territory. Walter J. Kiburz, 1500 Van Buren, Amarillo, Tex.

LET US PLACE a contract on your leases. Have several tracts in shallow, wildcatting, and semi-proven fields. Could use more. Need drillers for acreage, contracts; sell leases and do expert geological service. Gulledge Oil Exchange, Box 848, Dallas, Tex.

THE SCHEME of life is so arranged that some men have capital and need equipment, while others have salable articles and need cash. For these men, The Oil and Gas Journal Classified Section provides an excellent opportunity to broadcast their wants.

FOR SALE — Complete carbon black plant, located near Thermopolis, Wyoming. This plant installed at a cost of two to three hundred thousand dollars. Must be sold at once. Write to Nate P. Wilson, 415 Con Roy Bldg., Casper, Wyo.

Through the Classified Wants Section you can interest 25,000 oil men in your product or want. Mail your advertisement now for next week's issue. It doesn't cost much.

WABASH DRILLING CO., solicits your work. We maintain 10 strings of cable tools and will furnish estimates on work in any cable tool country. Bring on your wildcats. Wabash Drilling Co., office, Lawrenceville, Ill.

LETTERHEADS—PRINTING

CONSUMERS' LEDGERS
We are prepared to furnish from stock standard forms of gas meter Consumers' Ledgers. Sample forms and quotations on request. First class material and workmanship.
DERRICK PUBLISHING CO.
Oil City, Pa.

THE ORGANIZATIONS that get the bulk of the oil industry orders are those who are known to the industry and who can combine quality with speedy service. If you had your equipment listed in this section it would receive the same consideration that thousands are giving the good equipment advertised here.

OIL FIELD LEGAL BLANKS—Leases, assignments, releases, township books, well records, etc. Request on your letterhead gets free catalog. Olds Press, 215 East Third St., Tulsa, Okla.

WANTED

CAPITAL WANTED to develop attractive shallow acreage. J. Meers, Brady, Tex.

THE OIL and Gas Journal is read in Peru, China, Africa, Guatemala, Egypt, Alaska, Persia, Roumania, Spain, Switzerland, Czecoslavakia — everywhere. In fact, wherever there's oil, there are men reading The Oil and Gas Journal—"The Oil Man's Bible."

WANTED—Producing royalties Oklahoma and Kansas. Give full details. P. O. Box 502, Independence, Kans.

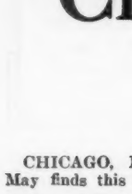
INCORPORATIONS

DELAWARE incorporators. Charters fees small, forms. Charles G. Guyer, 901 Orange St., Wilmington, Del.

Chicago Market Growing Stronger

Consumption Larger, Demand Good. California Invasion Not Feared. Kerosene Continues Firm, Deliveries Delayed

By J. B. Waldo



CHICAGO, May 1.—The advent of May finds this market fairly permeated with optimism. Even those who have been somewhat doubtful of the outlook for the coming season have been changed by recent happenings and like all new converts are the most active proclaimers of their belief that all sorts of good things are in store for the industry. As has been pointed out the market has been gradually growing stronger in tone as the consumption increased with the improved road conditions. There is so far as known here no great danger of an invasion from the west coast of California crude or gasoline. There may be a lot of both sold and shipped but it is not going to have any bearing on a reasonably good market price, according to the belief here. The crude situation is so tight, according to those who have tried to buy production, that the belief is most common that it is only a matter of weeks until there will be a crude advance in the Mid-Continent Field. Refiners state that their gasoline stocks are light and show no material increase. There are many who do not accept this statement at its full value but believe there are considerable stocks but also that they are in strong hands and will not be permitted to depress the market at least until later in the season and only then if there is some overproduction or marked decline in the consumption.

Consumption Larger

So far as consumption is concerned the first four months while not favored by good weather conditions for the time of year, was as a whole larger than last year by a comfortable margin. There has been some shifting of the business and it would be a difficult matter to convince many distributors that the Q. D. A. had not played a more important part than the writer really believes has been the case.

A very interesting topic to the oil men is the change in specifications of the "Texaco" gasoline. The new product has been received at various points, some in this city and some in neighboring cities and tests have been run all showing a close relationship, the usual initial being 90 degrees and the end point 394 degrees with a gravity in all instances close to 62 degrees. This product is being sold as its regular grade at the station price prevailing at the place of sale, subject to going discounts. The Standard Oil Co. of Indiana has resumed the sale of its ethyl gasoline but now it is blending the ethyl fluid with the gasoline at the refinery and shipping it treated instead of adding the ethyl fluid at the time the gasoline is sold through an attachment on the pump. This will oblige the ethyl gasoline to be sold from its own tank and through a separate pump and one of the company's stations here was being equipped with a new tank this week. Shipments are being made to the stations in the more distant parts of the territory now and all will be supplied before the larger demand is at hand.

Demand Good

The demand for gasoline from the jobbers was and is good. Previous to the tank wagon advance there was a rush of business from contract customers and to a lesser extent from the larger dealers so that these buyers should be supplied for a time but since the advance there has been a very fair demand and not all of the orders were for single cars. There is some Navy gasoline bought for May delivery at prices ranging up to 10½ cents or 10½ cents with a share of any tank wagon advance. Some buyers were more fortunate or judged the market more truly and bought for May delivery at 10¼ to 10½ cents flat over part or all of the month. There is possibly some 10-cent gasoline due for the first part of the month but the quantity cannot be very large and if the demand continues it will be absorbed at the present market which is firm at 10¼ cents with some asking 10½ cents but meeting real competition. The demand for the 56-58 gravity has increased and some refiners are shipping this grade on contracts but the bulk of the business is on the 58-60 437 U. S. Motors grade.

The higher tests are not active and this is partly due to the season of the year and partly to the expectation that the new cracked, antiknock gasoline will be preferred by consumers if sold at the price of the Navy grade. The Marland Co. will have a cracked gasoline out between the middle and the end of May which it will supply to its regular distributors at the same price as its Navy grade. At the office of the Roxana Petroleum Corp. it is stated that so far as this office knows the specifications of its gasoline will not be changed. Certain types of process stills produce this new grade regularly and the samples tested show little natural gasoline if any. The color is 23 plus or better than a straight water white. It has been stated that it costs no more to refine than the regular Motors gasoline. The export market here is quiet. There have been some statements regarding purchases for export at other points but generally there seems to be only a light demand from the exporters.

Natural gasoline has been a little stronger here as the result of the increased activity in the gasoline demand and the higher prices, but this product is, as it were, incidental so far as this city is concerned. The outlook is very favorably thought of here and the expectation seems to be that the price now quoted by many refiners of 11½ cents to the trade will be reached by the trade generally as soon as the jobbers begin to buy more freely again. This will be hastened by a good week-end. The Greenslade order for 1,000,000 gallons of U. S. Motors gasoline mentioned last week is reported to have gone at 10¼ cents to the Paragon people at Toledo. At least one order for 50 cars was placed for shipment into the Northwest at the same price so that some, if not many, of the larger buyers have covered their needs for the early future.

Kerosene Strong

Kerosene continues very strong and deliveries much delayed. There seems to be a difference of opinion as to the increase compared with last year. Some believe the actual increase in consumption is only the regular increase from season to season while others believe that more kerosene is being consumed than that increase would amount to. The refiners are so well sold ahead they will not promise shipment at less than a week or more and some of the best simply say they will get out the kerosene ordered as soon as possible, not making any promises. Some country jobbers are away behind the market. One order was received from a regular customer who wanted a car of kerosene and stated he had been quoted 6¾ cents but would pay for immediate shipment 6⅞ cents. Quite a number of orders have been entered to be billed at the market price day of shipment. The trade seems unable to understand what has happened that kerosene should be so scarce and strong but it is the result of changed methods of refining whereby much less kerosene is refined and by the demand for distillates for furnace oil which, as an old refiner said, all came "out of the same pot." There is a little kerosene still available at 8¾ cents although the market is very generally quoted at 9 cents.

Furnace Oil in Demand

Furnace oil is still in demand for immediate shipment. Several places are reported where distillate is being substituted for kerosene for tractor fuel and this use may increase but the real demand at present is for home heating. The market is generally firm at 4¾ to 5 cents although some straw distillate has been bought out of north Texas at a low price and is being offered the trade for quick movement at 4⅝ cents. The jobbers seem much concerned at the prospects for next season and are importuning their sources of supply for contracts for next season's requirements Refiners generally state they are not interested in contracts for next season and some say they will not run any distillate until late if then and they intend to get the market. If there is the same relation to kerosene as prevailed this season, the price will be much higher than during last season. With gasoline in such good demand and kerosene wanted so badly the refiner naturally thinks of distillate as something that can be attended to later, and sees no reason why he should quote now unless it be to oblige a good customer.

Gas Oil

Locally the demand for gas oil is not as strong. The demand for heating is over and the industries can get along better without it than they could in the winter time but there is no real weakness. Just a little easier to buy in some fields. The large demand for home heaters is over for this season and this does away with that demand but the refiners are expected to operate their cracking stills at maximum shortly and the trade sees no prospect of a materially weaker market. The top price here right now is 4¼ cents but this price is not so easy to secure and more is selling at 4⅛ cents.

Fuel Oils Firm

Fuel oils are still firm and Smackover is higher due to advances in the field. No one here really understands why the Smackover product is higher unless it is that a crude advance is anticipated. There are some who believe the quantity of Smackover crude being run to the cracking stills will be larger due to the increased demand for gasoline. At any rate the bottom price there today is $1.10 for resale and one producer has advanced his price to $1.20. Considerable cheap oil is still owned here and the market has only partly responded to the advance in the field with sales being made at $1.10 although the asking price is $1.12½ to $1.15. There is no real change in the fuel oil demand. There are more contracts expiring in this market and there holders are not renewing at the present market but securing supplies through spot purchases which makes the spot market more active. The consumption for heating purposes is dwindling rapidly but the industrial consumption is holding its own and promises to gain with the coming of spring weather and the settlement of several industrial disputes which have held up new building operations in this locality. The local building boom is still very active and the auto industry is running at high pressure and these have been the real source of the most active industrial demand for several years. The consumption of food stuffs and of clothing for men and women is undoubtedly large but the present tactics of the dealers to carry small stocks and order frequently makes the business seem less than it really totals. The present method of purchasing is favorable to the larger sources of supply as they can carry the stocks needed to make the quick deliveries demanded. In fact some of these larger distributors advise their customers not to carry large stocks but order frequently by wire if necessary and promise shipment within a few hours. They point out that this method enables the dealer always to have fresh stocks, requires less investment and has other advantages. On the other hand it simply makes the storekeeper the agent of the wholesale house. The method works in many cases and tends to reduce the number of concerns in any line of business in which it becomes general. Supplies of fuel oil are still held with great firmness in most districts although at times there are more free offerings out of some of the more distant or less developed fields such as north Texas or northern Louisiana. Generally the business is confined to gravities lower than 24-26 oil and in fact the 18-22 is being less freely offered and 17 and 16 gravities are taking its place with many refiners.

There is a constant inquiry among the trade and large consumers as to what has become of all the fuel oil. One thing is evident and that is that the skimming plants are no longer operated, at least generally, and it was these skimming plants that ran the larger percentages of fuel oil from the crude. In the old days there were numerous skimming plants that never ran less than 50 per cent fuel oil and some used to run 60 per cent fuel oil and 40 per cent of the lighter products. It seems to many this is more largely the cause of the light offerings although this has been of great effect in reducing the quantity of fuel oil from the crude run to the stills. The asking price for a good refinery fuel oil of anything less than an 24-26 gravity is generally quoted at $1.30 at the Group 3 points. Higher grades are scarce and very firmly held at prices which practically amount to a premium. With the warmer weather the demand for these gravities will naturally decline but there seems little prospect of any material increase in the supplies at an early date. It was in May of last year that some refiners began to store fuel oil and stocks as reported now and no larger than they were a year ago.

Lubs Active

Lubricating oils continue active and generally firm. Neutrals are being sold by some refiners at prices somewhat less than the list, say 1 cent to 2½ cents, but generally the refiners are not paying any attention to the action of the one or two plants making these low prices. Jobbers are ordering freely for stock and getting ready for the increased consumption. The consumption of lubricating oils follows very closely the up and downs in gasoline burned and the trade is anticipating a good business this season. Some refiners and distributors of the higher grades are very much pleased with the results of their efforts to educate the public to the need of using an oil that is of reliably high quality. They say the public will now pay the difference willingly and realize that they secure through the use of these better lubs longer life and more smoothly operating engine.

Tank Wagon Advance

The advance in tank wagon prices on gasoline and kerosene over this territory came as expected. The remarkable thing is that several predictors found their prediction come true. Some seem really surprised their guess was so good. The prediction as made 10 days before the advance that the increase would be 1 cent on gasoline and one-half cent on kerosene on April 29 or 30. The in-

crease has been made general by the action of the other Standard companies from the east coast to the Rocky Mountains. The trade is already talking of when the next advance will be made but this seems a little early. The gallonage is very good and the demand promises to continue as the number of cars is large and the tendency to use them is not diminished. The general situation is very good with the expectation of what the smaller distributors claim is the unsettling effect of the Q. D. A. One such instance developed recently in Indiana where one of the larger oil companies which is usually in harmony with the Standard ideas made a contract with a farm association to give a rebate to its members figured on their total purchases month per month. The management of the association notified the farmers to order from this particular company, pay cash for deliveries and send him the receipts. He would collect the discount and prorate among the members. Then the trouble began and the oil company tried to get out of the contract offering to pay a substantial sum for a release but the farmers would not release the oil company so there is liable to be a sore spot around Fowler, Ind., for the remainder of the contract as the other oil companies have met the price or done better.

But there are local conditions and will be generally worked out in time and nothing is gained by cutting of prices on the total sales to secure a small amount of business. One larger refining organization recently sent its sales manager over the territory it covers which is largely around Chicago and to the west and northwest. He reported on his return that every oil man seemed to be selling a lot of gasoline and other products and that they were very optimistic. They seemed to have great faith in the price position as at present outlined and to believe the next move would be an advance in Mid-Continent crude and higher prices for all petroleum products. There is one thing that must be remembered and that is that there are other refining sections. For example jobbers in Milwaukee have been offered Pennsylvania gasoline at a very small differential over the present price of the Mid-Continent product and it is a higher gravity, something over 44 degrees. Some eastern kerosene is coming into the eastern parts of the territory and it is predicted that with a 12-cent refinery market in the field for Navy, the territory east of the Indiana-Ohio State line would be liberally supplied from other sources than the Mid-Continent at lower prices than the 12 cents, plus freight, would figure.

EASTERN SITUATION NOW SO STRONG FURTHER ADVANCE IS EXPECTED

By N. O. Fanning

New York Bureau, The Oil and Gas Journal, 30 Church St., New York

NEW YORK, May 3.—A general advance of 1 cent a gallon in the tank wagon price of gasoline on the Atlantic Seaboard was the feature of the refined oil market during the past week. The Standard Oil Co. of New Jersey advanced prices 1 cent in all its territory except North and South Carolina, where prices were raised 1½ cents. The Standard Oil Co. of New York advanced the tank wagon market in New York State and New England 1 cent a gallon to 20 cents. The Atlantic Refining Co. also advanced tank wagon prices of gasoline 1 cent throughout its territory. The New Jersey price is now 18 cents. The New York prices are effective May 1. The Atlantic prices were effective May 3.

The Standard Oil Co. of New York also advanced tank wagon kerosene 1 cent to 17 cents, while the Standard Oil Co. of New Jersey raised the price ½ cent, making it 15½.

In addition, the Standard Oil Co. of New Jersey advanced export gasoline ½ cent to 28.65 cents a gallon, in cases, while export kerosene was advanced to 18.65 for standard white in cases, and 19.90 for water white in cases.

These advances have been expected right along, and the situation is described as so strong now that further advances, especially in the tank wagon gasoline market, are looked for within the near future.

Increase Abnormal

The new advances will increase the spread between eastern and Mid-Continent gasoline prices to an abnormal point, despite recent advances in the latter territory, and marketers here point out that in all probability the Mid-Continent price will advance further, perhaps to at lesat 13 or 14 cents. The Mid-Continent has consistently remained behind other markets, in their opinion, but should presently catch up to the big consumption all over the country.

Refiners here point ou that recent advances in the price of kerosene and gas oil throughout the country has made the production of gasoline more expensive, due to the prevalence of cracking, and they say refinery profits are now extremely narrow. Naturally the only direction in which this situation can be righted is by advancing the price of gasoline.

Kerosene Scarce

The kerosene market is strong. There has been a very good demand for furnace oil, larger than had been expected. In addition, the export market has held up unusually well, shipments to the Far East and South America being above normal. Lastly, kerosene has been held tightly by refiners who foresee a record demand for gasoline and are building up their cracking stock.

Gas and Fuel Oil

The situation as to gas oil is especially strong at this time as sales to gas companies are heavy, involving several hundred million gallons on yearly contracts, and also because of the demand for gas oil for cracking purposes. The price here is 6½ cents a gallon for 28 plus in tank car lots, but it would not be surprising for it to go to 7, from present indications.

Disel oil continues firm, with business increasing steadily.

Bunker oil is firm, but business is dull. The price remains steady at $1.75 for grade C.

Lubricating Oils

The market for lubricating oils continues to improve. Stocks are fairly restricted, and supplies seem to be in strong hands. Cylinder stock is showing the best tone at present, but a steady gain in demand for red and pale oils is noticeable. Prices on all lubs are stationary, however.

Paraffin Wax

Paraffin waxes are in good demand, with special improvement to report in the lower melting points. Some refiners are asking as much as 6¼ cents a gallon for 120-122 a.m.p., as against recent sales at as low as 5⅞.

Petrolatum

The petrolatum market is also improving, with a more steady movement into domestic and export consumption. Some fairly large export orders have been booked recently. Amber and light amber are in demand with still no advance in prices.

The Export Market

The oil export situation here is somewhat mixed. Present rate of shipments promises to hold up for some time, but exporters are somewhat concerned over financial developments in some of the European countries. There is a tendency toward raising of barriers in the form of import duties, which may in the future restrict the use of automobiles and petroleum products and thereby affect somewhat the American export trade in these items. Just how far these tendencies will go is a matter that cannot be forecast, and there is a possibility that they may be offset by other considerations, even if they should materialize.

Meanwhile exports are holding up well at New York, and the past week witnessed an unusually heavy outgo of lubricating oils and wax.

Lubricant shipments reported during the week aggregated 4,256,373 gallons, including 1,343,403 gallons in bulk, 2,534,150 gallons in barrels and 378,820 gallons in cases. The barrel and case exports are particularly noteworthy, and consisted principally of a comparatively small number of large lots. The barrel exports were largely to Europe and case shipments were to India and Africa. Two large consignments consisted of 12,212 cases to India and 14,319 cases to South African ports.

Crude oil exports during the week were above normal, there being a bulk shipment consisting of 1,740,067 gallons to Italy, and also some large barrel shipments.

Petroleum asphalt continued to be a feature of the export trade, total shipments aggregating 1,992,150 pounds, all shipped in barrel lots. The largest single consignment was to India.

The following table shows principal exports of petroleum and petroleum products from New York during the last three weeks (figures in gallons unless otherwise noted in parentheses):

	Week Ended		
Gasoline:	Apr. 28	Apr. 21	Apr. 14
Bulk	.....	.....	306,175
Barrels	.....	.....	150,700
Cases	1,602,740	1,021,790	1,445,490
Kerosene:			
Bulk	1,405,017	.....	2,908,783
Cases	800,660	2,471,760	1,664,400
Gas oil:			
Bulk	195,659	.....	369,889
Fuel oil:			
Bulk	225,304	.....	.....
Lubricating oil:			
Bulk	1,343,403	1,483,636	215,000
Barrels	2,534,150	1,765,500	1,638,750
Cases	378,820	258,120	127,460
Lubricating grease:			
Barrels (lbs.)	985,050	475,650	225,000
Paraffin wax:			
Bags (lbs.)	3,633,080	895,400	1,212,200
Barrels (lbs.)	195,700	.....	472,200
Petroleum asphalt:			
Barrels (lbs.)	1,992,150	288,000	2,567,250
Crude oil:			
Bulk	1,740,067	.....	.....
Barrels	171,150	.....	147,500

The foregoing figures do not include shipments of less than 500 bbls. or 1,000 cases.

Tanker Charters

The oil tanker chartering market continued active, without any special feature as to activity or rates.

New fixtures included the following:

Tanker Virginia (Am.), 5,048 tons net, Gulf to Copenhagen, about 70,000 bbls. of gas oil, 29s. per ton, May loading.

Tanker Wellfield, (Br.), 3,296 tons net, Gulf to two ports of French Atlantic, 29s., June loading.

Tanker Torres (Am.), 2,955 tons net, Gulf to north of Hatteras, 27 cents a barrel, early May loading.

Tanker Nord Atlantic (Nor.), 2,970 tons net, lubricating oil, north Atlantic to Bordeaux-Hamburg range, 25s. 3d., option Gulf loading, 4s. extra, with 1s each additional port of discharge, July loading.

Tanker Conrad Mohr (Nor.), 2,055 tons net, north Atlantic to United Kingdom-Continent, 27s., option Gulf loading, 30s., June loading.

Tanker Merope (Fr.), 9,000 tons, Gulf to south France, 30s. 6d., gasoline and kerosene, 1s. extra if two ports, April loading.

Tanker Superga (Ital.), 7,200 tons, Gulf to one, two or three ports of United Kingdom-Continent, basis 27s., gasoline and kerosene, June loading.

Oil Receipts

Estimated receipts of crude and refined oil by tanker at Atlantic Coast ports for the week ended April 21 were 4,113,000 bbls., a daily average of 58,000 bbls., compared with 4,080,000 bbls., a daily average of 583,000 bbls., for the week ended April 14.

Receipts from the Gulf Coast for the week were 2,507,000 bbls., a daily average of 358,000 bbls., as against 1,829,000 bbls., a daily average of 261,000 bbls., the week ended April 14.

Receipts from the Pacific Coast totaled 650,000 bbls., 93,000 bbls. a day. This compares with 949,000 bbls., a daily average of 136,000 bbls., during the week ended April 14.

Imports totaled 956,000 bbls., a daily average of 137,000 bbls., against 1,302,000 bbls., a daily average of 186,000 bbls., the preceding week.

Of the imports for the week ended April 21, 832,000 bbls. came from Mexico, and 124,000 bbls. from Venezuela. In the previous week, 1,079,000 bbls. were imported from Mexico, 47,000 bbls. from Peru, 137,000 bbls. from Venezuela and 39,000 bbls. from Trinidad, or a total of 223,000 bbls. from sources other than Mexico.

The following table shows estimated daily average receipts of crude and refined oil by water at Atlantic Coast ports from the Gulf and Pacific Coasts of the United States, and imports, for the last three weeks; also monthly record for the last 12 months (figures in barrels):

	Week Ended		
	Apr. 28	Apr. 21	Apr. 14
GulfCoast	358,000	261,000	350,000
Pacific Coast	93,000	136,000	79,000
Imports	137,000	186,000	158,000
Total	588,000	583,000	587,000

Daily Averages by Months

1926:	Gulf	Pacific	Imports	Total
March	317,000	97,000	178,000	592,000
February	332,000	73,000	122,000	527,000
January	279,000	59,000	96,000	434,000
1925:				
December	298,000	56,000	103,000	457,000
November	259,000	36,000	92,000	387,000
October	249,000	36,000	102,000	387,000
September	306,000	66,000	76,000	448,000
August	291,00	54,000	90,000	435,000
July	391,000	63,000	107,000	561,000
June	379,000	66,000	118,000	563,000
May	312,000	81,000	145,000	538,000
April	353,000	78,000	101,000	532,000

The foregoing estimates are based on the carrying capacity of incoming oil-laden tankers.

OKLAHOMA FIELDS

(Continued from Page 42)

and made 5 bbls. on the pump after a shot of 10 quarts.

Comanche County

Mid-Kansas Oil & Gas Co. is drilling at 250 feet in No. 1, SW cor. NE, Section 21-4-10w. Cook & Graham have spudded No. 1, SW cor. SW, Section 34-4-10w.

Westheimer & Daube are drilling at 350 feet in No. 1, NE cor. SE NE, Section 24-2-10w.

Grady County

Prairie Oil & Gas Co. is rigging up a rotary for No. 4 Tooler, NE cor. NE, Section 22-5-8w. Sinclair Oil & Gas Co. is fishing at 975 feet in No. 4, CEL NE SE, Section 22-5-8w. Skelly Oil Co. has completed a gas well in No. 3, NW cor. NE NW, Section 23-5-8w. Broken sand was 2,085-2,375 feet and the well is shut in with 33,000,000 feet of gas. Magnolia Petroleum Co. has a rig up for No. 1 Dryden, C NW SE, Section 35-5-8w.

Prairie Oil & Gas Co. and others have built a rotary rig for No. 1 Cochran, SW cor. NE NE, Section 27-3-5w. Gant and others have built a rotary rig for No. 1 Cochran, SW cor. NW SE, Section 27-3-5w. Magnolia Petroleum Co. is drilling at 450 feet in No. 1, NE cor. SW SW, Section 27-3-5w, and No. 1 Mitchell, NE cor. NW, Section 34-3-5w, is a rotary rig. Clark, Cowden and others have a failure at 2,104 feet in No. 2, CSL NE NE SW, Section 33-3-5w. Carter Oil Co. is rigging up a rotary for No. 3 Dryden, C NW SW, Section 2-4-8w. Prairie Oil & Gas Co. has built a rig for No. 2 Mayo, C SE NE, Section 3-4-8w. Clark & Cowden have a dry hole in No. 1, NE cor. NE, Section 11-3-8w, which is abandoned at 3,010 feet.

Caddo County

Briscoe & Hall have a rig on the ground for No. 2 Williams, SE cor. SW SE, Section 31-6-9w. Continental Oil Co. and the Diamond Oil Co. have abandoned the location for No. 1, CEL SE SE, Section 1-5-9w. Gorton Trust is drilling at 250 feet in No. 4, C SE SW, Section 12-5-9w.

BUY WEST VIRGINIA LEASES

Henaghan & Hanlon, producers of natural gasoline, have purchased the holdings of the Associated Producers Co. in Ritchie County, West Virginia. The property consists of 1,000 acres of leases and 37 producing oil wells.

Briquetting Process Adds to Profits

Fernholtz Method in Use at Carbon Black Plants Adaptable for Handling Coke in Refinery Operations

By L. P. Stockman

The coke problem, which threatened to bury many refineries unless some method was devised for disposing of this by-product resulting from increased use of cracking units, has apparently been solved by the Fernholtz process of briquetting whereby this residue is converted into a very desirable fuel. The economic importance of this process is quite evident and it is needless to say that those familiar with refining problems were the first to appreciate its possibilities. Comparatively little cracking is being done in California at the present time but this method of increasing gasoline production will come into its own within the next few years and it is axiomatic that the most efficient operator will be the most successful. Briquetting, which is the process of fabricating fine materials into blocks of larger size but essentially the same composition, through the medium of a press, with or without other operations in connection therewith, will increase a plant's efficiency to a large degree by utilizing a heretofore waste product.

Oil coke briquettes are far superior to either the coal or carbon black briquette, which is a carbonaceous oily residue of the California gas plants where illuminating gas is manufactured from petroleum. There are several Fernholtz carbon black briquetting plants in use at Los Angeles, San Diego, San Francisco, Oakland and Portland, Ore., and, while no installations of the oil coke process have yet been made in California, due primarily to the limited amount of cracking being done, the inventor, Emil Fernholtz, is making preparations to put in two plants within six months. Fabrication has just about been completed on the installation to be made for the Producers & Refiners Corp. at Parco, Wyo., and material should be en route to that point within two or three weeks. O. G. Wilson, Jr., assistant chief chemist of the Gulf Refining Co., recently made a very exhaustive test at the Fernholtz experimental plant located near Los Angeles and he will undoubtedly make a favorable recommendation.

Problem of Coke

With the advent of the highly perfected cracking processes in the oil refining industry the problem of successfully commercializing at a profit the greatly increased volume of coke residue, by briquetting, has been receiving close study by the Fernholtz engineers with the result that many of the large oil refineries are adopting the Fernholtz press and process, and turning a hitherto almost waste product into a substantial and profitable by-product. Under present refining methods less than 25 per cent of the oil coke is merchantable, and the price obtained is much less than its true fuel value by reason of the fact that it is subject to rapid disintegration in handling. The Fernholtz oil-coke press has demonstrated its practicability on a commercial tonnage basis with only a fractional loss in the amount of raw material, and produces fuel for which the following are claimed:

(1) High B.t.u. value, ranging from 15,000 to 15,500.
(2) Small ash content, 1.5 per cent.
(3) No clinkers.
(4) Uniform size.
(5) Compact and hard, with no material loss in fines.
(6) Does not absorb moisture.
(7) Will not disintegrate in open storage.
(8) Low cost of manufacture, being made without a binder.
(9) No smoke after igniting.
(10) No stoking required, as it remains firm while burning.
(11) It is not subject to spontaneous combustion while in storage.
(12) Ideal domestic and industrial fuel.
(13) Very practical and economical fuel for steam rollers and portable steam power plants due to its high B.t.u. value, uniform, size, absence of clinkers and no smoke and ash content.
(14) Unlimited possibilities for smeltering purposes due to high B.t.u. value, low ash and low sulphur contents.
(15) By dipping briquettes in distillate, which is readily absorbed, they can be used to start a fire without using wood.
(16) By passing briquettes through a hot paraffin bath they can be handled without soiling the hands.
(17) For above reasons should bring a higher price than any other fuel on the market with substantial profits to the refiner as a by-product.

Figure 2—Mr. Fernholtz explaining the advantages of the process to an interested group.

Capacity and Operation

The Fernholtz oil coke briquette presses, which have a speed of 100 R.P.M., are made in units having a capacity of three tons per hour. As shown on the accompanying drawing, the oil coke can either be conveyed to the receiving hooper "A" by means of a conveyor or side dump cars. The capacity of the receiving hopper is optional with the operator, depending on local conditions. From bin "A" the material drops into enclosed feed tunnel "B" on to steel belt conveyor "C." Belt conveyor "C' feeds the raw coke in regulated portions into a large Fernholtz star crusher "D." The purpose of star crusher is to crush large lump sizes down to 1-inch mesh. The crushed coke is discharged by gravity chute "E" into steel elevator "F." The elevator discharges the coke through chute "G" into revolving Fernholtz exhaust steam dryer "I."

The purpose of dryer is to evaporate all excess moisture to a desired percentage and discharge the dried coke through chute "J" into Fernholtz pulverizer "K." The pulverizer pulverizes the coke and discharges it through chute "L" into steel elevator "M." Elevator "M" discharges the material into sizing chute "P" back into pulverizer "K." The screen is provided with a two-way chute "Q" and enters into storage bin "R." The purpose of storage bin "R" is to have a large quantity of pulverized material ready for briquetting to assure a constant and even supply of material. From storage bin "R" the pulverized coke is fed onto an adjusted feed belt conveyor "S" into a Fernholtz double shaft tempering mill "T."

The tempering mill is to assure an even percentage of moisture for proper briquetting of the oil coke. From tempering mill "T" the coke passes through a Fernholtz granulator "U" discharging into the briquette press feed bin "V." From the feed bin the coke passes through the Fernholtz patented briquette feeder

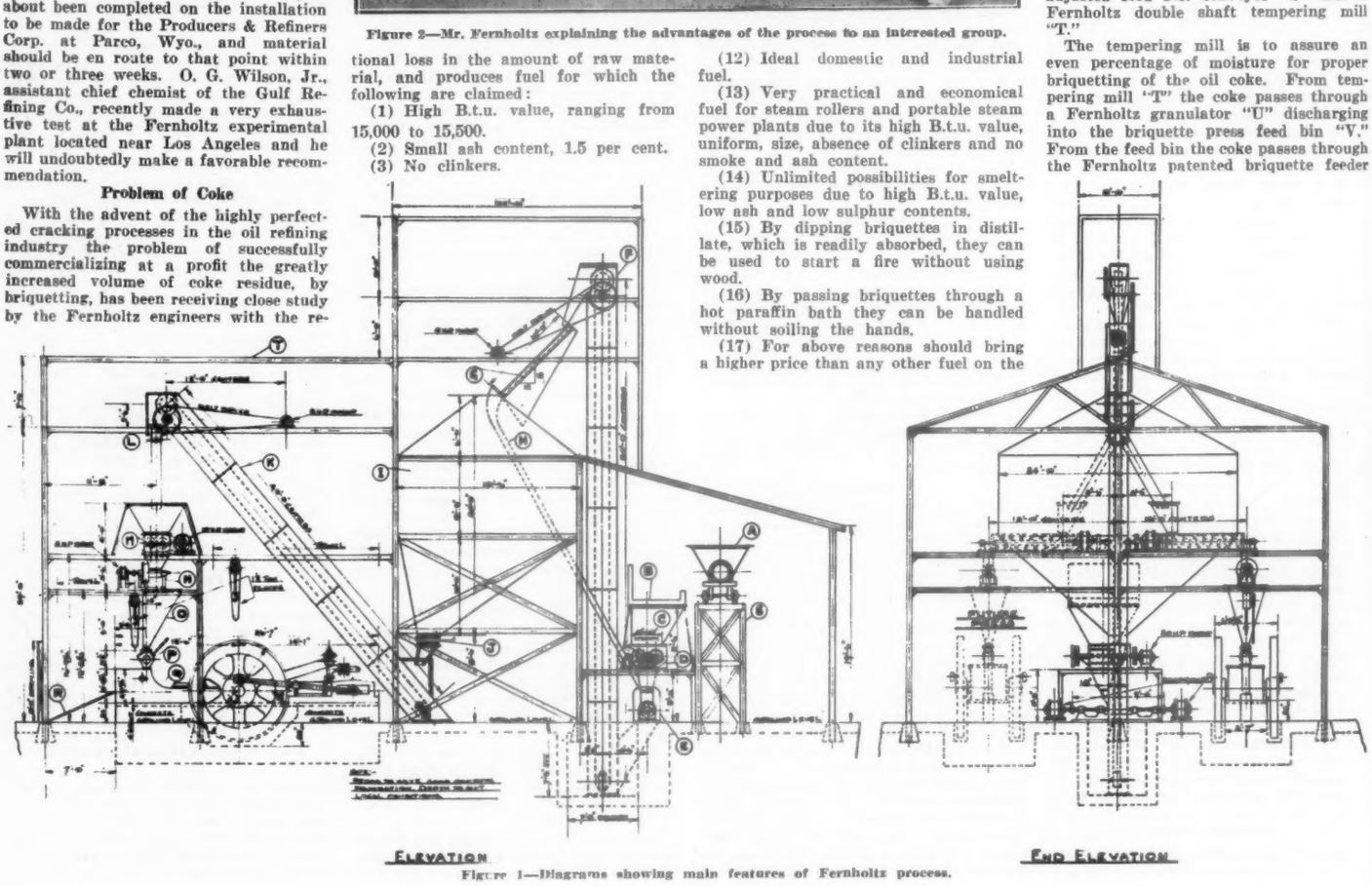


Figure 1—Diagrams showing main features of Fernholtz process.

"W" into briquette press "X." In the briquette press the oil coke is compressed into a solid block and is discharged from the mold cavity into briquette delivery trough "Y." From this briquette delivery trough the briquettes are either discharged on to a belt conveyor delivering the finished briquettes into storage bins or direct into cars or trucks for delivery. The method of handling the finished briquette from the briquette press is optional, depending upon local conditions.

The briquette press is driven direct by a 125-horsepower slip-ring General Electric electric motor. The crushing, elevating, drying and tempering machinery can either be driven by direct motor drive or by line shafting. The direct drive, however, is recommended by the Fernholtz engineers. The total power required for the operation of the plant is two 125-horsepower motors for the operating of the presses and a total of 100 horsepower for operating the balance of the equipment. These estimates are for a plant having a daily (24-hour) capacity of 120-144 tons of finished products. Housing the press is optional, depending on local weather conditions. That the oil industry, ever aiming at greater efficiency and the elimination of waste in its operations, will welcome this new method of reclaiming and turning into substantial profit what is now, under the vastly improved cracking method, an almost entirely waste product, is beyond question.

ROCKY MOUNTAINS

(Continued from Page 42)

double the capacity. After the installation of new compressors, the plant will be able to handle 6,500,000 feet daily of gas and an estimated production of 3,500 gallons daily.

The muddy roads have held up all field work for some time, in the LaBarge Field in Lincoln County, but the roads are now drying fast and the work is starting again.

Test West of Denver

On Section 1-2-68, about 10 miles west of Denver, the Municipal Oil Co. made up of Denver business men is preparing to start a wildcat. This well is located in the lower Tertiary formation and the depth to the producing sands of this region is generally thought to be prohibitive as the estimates run from 6,000 to 8,000 feet.

The Wallace Creek wildcat of the Continental Oil Co. on the leases of the Consolidated Royalty Oil Co., Section 15-34-87, Natrona County, Wyoming, found a second sand at 3,994 feet and water. The well is a duster and the casing is being pulled. This location is started in the lower tertiary on the north side of the Rattlesnake mountains. Several oil seeps occur along the flanks of this range, indicating that the sands carry petroleum. Some sporadic drilling was done back in 1912 and 1913, but the Contintental's well is the first deep test there.

The Fort Collins to Cheyenne gas line is making about a mile a day a present. This line will carry gas from the Fort Collins Field to Cheyenne and is being laid by Wiley & Gates, contractors for the local gas companies which are controlled by the Cities Service Co.

The east side of the Teapot Dome, outside of the Naval Reserve, has some shallow oil in the Shannon sand at about 900 feet. The Burke Syndicate drilled a well to about 2,000 feet and went through the Shannon sand at 865 feet, finding a showing of oil. After the well had been standing for a time, it filled up with oil and a test made 65 bbls. per day. Due to small capital, nothing further was done, but a company was incorporated last week at Cheyenne, under the name of the Teapot Consolidated Oil Co. with a capitalization of $500,000 and the sale of stock is expected to provide funds for the development of the area. The new company has holdings along the east side of Teapot aggregating about 800 acres, much of which lies inside the escarpment and is considered productive in the Shannon sand.

Governor Nellie Ross, of Wyoming, has signed the contract between the State and the Producers & Refiners Corp. in spite of the threat of suit brought by a Cheyenne attorney who also put in a bid. This contract is for the royalty oil taken from the leases owned by the State in the Salt Creek Field and will amount to about 50,000 bbls. monthly for the Producers & Refiners refinery at Parco. The oil will be shipped through the company's line from Salt Creek to Parco.

The attorney, William C. Kinkead, filed suit the day following Governor Ross' signing of the contract and the suit is based on the statement that no advertisement of the sale was made in Natrona County, that no appraisal was made of the property, that the sale should have been held in Casper instead of Cheyenne, that the methods of the State Board tended to discourage free and open bidding and discourage competition and that the public was not admitted to the sale and therefore it was not a public auction.

Using Wireless

The Ohio Oil Co. and the Illinois Pipe Line Co. have been operating two wireless stations between Casper and Findlay, Ohio, for the past four years successfully. The two companies will now place a large station in the Sunburst Field in Montana that will also be able to communicate direct with Casper and Findlay and plans are being considered to link all the districts where the Ohio Oil Co. and the Illinois Pipe Line Co. have extensive holdings, in a similar manner with the head offices of the company and with each other. Material for the new station at Sunburst is expected shortly and the new station will probably be operating by the middle of June.

Runs for the Week

Salt Creek	56,850
Teapot	1,150
Big Muddy	3,500
Grass Creek	2,900
Elk Basin	620
Greybull	45
Rock River	3,100
Lance Creek	1,820
La Barge	150
Poison Spider	480
Osage	350
Hamilton Dome	1,160
Lander	250
Byron	30
Lost Soldier	4,260
Ferris	50
Simpson Ridge	200
Cat Creek	2,970
Lake Basin	160
Sunburst	18,500
Florence	360
Moffat	3,100
Tow Creek	105
Fort Collins	2,640
Iles Dome	95
Boulder	25
Rangeley	100
Hogback	440
Rattlesnake	70
Artesia	3,000
Total	108,480

NORTH TEXAS MARKET EXTREMELY UNSETTLED

WICHITA FALLS, Tex., May 3.—North Texas refined markets were extremely unsettled the past week. Tank wagon advances in gasoline and kerosene throughout the territory of the Standard Oil Co. of Louisiana, as well as other districts, and an increase in export postings caused rapid boosts in refinery quotations of those products and not until Monday were prices stabilized sufficiently to determine the real market level.

The rapidly advancing prices checked noticeably inquiries and orders, all refined products continued to strengthen at the new record prices of the year. Earlier in the week exporters were actively in the market both for the 64-66 and the 60-62 gasolines and the influence of these purchases, which amounted to approximately 2,000,000 gallons, still is being felt in the higher prices asked for these products.

Exporters still are reported in the market but their offers of 12½ cents for 64-66 375 gasoline are going begging with refiners asking mostly 12¾ and 13 cents.

Monday the U. S. Motor (58-60 437) gasoline apparently had settled at 11¼ cents as the market level for future sales at 11½ and 11¾ cents indicated further advances in refinery quotations on this product were expected.

Natural gasolines Monday were in a chaotic state. After a week of only slowly advancing prices, sellers Saturday started a flurry of boosting quotations with apparently but little increased activity to back them up, the advances being largely due to the psychological effect of stronger straight run markets. Quotations on all grades Monday were from 1½ to 2 cents higher than during the middle of the week.

Kerosene also jumped to new high marks with buyers more than ready to pay 9 and 9¼ cents for the product if they could get it. This product now is reported as scarce in this district as in Group 3. Most refiners are at least a week behind with their orders and are booking nothing now except to their direct trade.

There were no developments in fuel oils, gas oil and distillates and prices were practically unchanged over a week ago. Distillates were slightly stronger due to the strong kerosene situation but buyers were puzzled that they did not show even greater strength.

Fuel oil was soft as no important activity materialized along this line. However, the product was still bringing from $1.35 to $1.40 for the 24-26 grade. Gas oil was available at 4 cents as in previous weeks.

"BILL" LONG, OIL AND GAS MAN, PASSES ON

(Continued from Page 31)

that the oil business was the one in which he would cast his fortune. He had worked in the fields during his vacations and had a good groundwork in the business, when he entered it in earnest.

Mr. Long was a drilling contractor for several years in partnership with Captain Finley of Pittsburgh. He drilled in western Pennsylvania, southeastern Ohio and West Virginia, and was a familiar figure around Stringtown, Sistersville, Salem, Clarksburg and New Martinsville.

In the Supply Business

Always being interested in machinery and being made of the stuff of which salesmen are made he quit contracting and went into the supply business. In 1900 he became a salesman for the Oil Well Supply Co., out of Clarksburg, W Va. He was three years with this company and visited every field in that territory. He did some operating on his own account and opened a small pool in the West Virginia Panhandle at Wellsburg. The oil from this pool was so clear that a dime could be seen at the bottom of a 250-bbl. tank. He sold out his interest

W. G. Long

and with Joe Trees of the famous combination Benedum & Trees, Mr. Long drilled the first gas well in the Robinson, Ill., field. He opened a supply store in Robinston which he later sold to the Oil Well Supply Co. He operated in Indiana and again in West Virginia and then took part in several Illinois developments with varying success.

He went to Shreveport from Centralia, Ill., in 1910, and was manager of the National Supply Co's. store. The fever to keep moving led him to Wichita Falls in 1911 at the opening of the Electra Pool and there he engaged mostly in the business of buying and selling leases and land. He came to Tulsa in 1914 and two years later he and O. K. Eysenbach bought the Robinson family's interest in the Robinson Packer Co., and for the next nine years he was treasurer and general manager of that company and his business carried him into the California and Rocky Mountain areas, which completed Bill's rounds of America's oil countries. There were few pools south and west of Oil City which he did not visit at some period of his life.

In 1925 Mr. Long sold out his interests in the Robinson Packer Co. to his partner and practically retired. He did some business in leasing but his health was such that he had no heart for the old strenuous life.

A Writer of Verse

"Bill" Long had one hobby out of which he got a large amount of pleasure, which he passed on to his friends. It was the writing of verse, most of which had to do with one or another phase of oil. He published one book of verse which was called "Lubrication", and which is in the library of many an oil man, and most of the lines he wrote found a publisher in one or another newspaper or trade magazine.

Mr. Long attended every national gas convention for 10 years and at each of them consistently sought to hold the next year's meeting in Tulsa. It was one of the great disappointments of his declining days that he would not live to see the fruition of his efforts, as he was conscious of the fact that he could not live until the week of the gas convention in Tulsa in May.

Mr. Long is survived by his widow and one son, Clarence R. Long of Tulsa and two stepchildren, Edward Little and Sarah Long, and one brother, the Rev. A. P. Long, retired, of Naples, N. Y.

The funeral was held Tuesday, May 4, at the First Methodist Church, and burial was in Rose Hill Cemetery, Tulsa.

POPE CONFERS HONORS ON OKLAHOMA OIL MEN

A number of Oklahoma oil men were among those who were recently the recipients of various papal honors. Thomas Chestnut of Tulsa and John H. Markham of Tulsa were made Knights of St. Gregory by Pope Pius XI. Charles P. Quinlan, Leo Freymuth and Mrs. John H. Markham, Jr., of Tulsa, received the gold cross Pro Ecclesia et Pontifice, and D. E. Buchanan was given a gold medal of honor by the pope. Dennis Flynn, of Oklahoma City, an Indian Territory and Oklahoma pioneer, was made a Knight of St. Gregory.

The honors were conferred for outstanding services in the cause of humanity, education, religion or the State.

Messrs. Chestnut, Quinlan and Buchanan are all prominently connected with the Chestnut & Smith Corp., natural gasoline manufacturers. Mr. Markham is a prominent oil producer and Mr. Freymuth is head of the oil run department of the Cosden Pipe Line Co.

KERN RIVER RESERVOIR FIRE

LOS ANGELES, Calif., May 1.—The Standard reservoir, destroyed last Friday at Kern River, contained 496,000 bbls. of fuel oil and boiled over for 19 hours after being hit by lightning. The fire was confined within retaining walls and no damage resulted to the other 10 reservoirs located 500 feet apart.

WITH ILLINOIS MARKETERS

CHICAGO, May 3.—G. A. Primm has been named field secretary of the Illinois Petroleum Marketers Association. He will devote a large part of his time to legislation of interest to the marketing fraternity in Illinois.

REFINING AND MARKETING

NEW TEXACO GASOLINE SUPPLIED AT CHICAGO

CHICAGO, May 1.—Some of the local stations of The Texas Company and the same is true regarding Milwaukee and other surrounding points have received supplies of the new Texaco gasoline. Tests have been run which show an average A. P. I. gravity of 62 degrees. The initial is close to 90 degrees, one sample tested showing 94 initial and another 102, these being the extremes. The end point varied from 394 to 396 degrees. One sample run by a very prominent chemist showed that 96 per cent distilled over with a residue of 1.11 per cent, the balance being loss. The expected campaign in the newspapers has not materialized yet. Some say it will begin next week and others that it is to be deferred for one month when the supplies will be accumulated. There has been considerable doubt whether the new gasoline will be sold subject to a Q. D. A. discount but the best information obtainable is that the present arrangements and contracts will apply to the new product. In fact, some dealers state so openly. In Milwaukee contract customers when they pay for a fill receive two receipts, one of which is to be sent to the division headquarters at Minneapolis from which office the discount will be paid.

The trade expects the new product will meet the demand of the general public for a quick acceleration and speed even if it should prove to be of less pulling power as some claim but those who have tried the new product are warm in its praise. Locally we have no hills to climb but on the few grades we have it is said to show great climbing power.

REFINERY AT RUSSELL TO PIPE LINE COMPANY

The Russell County Pipeline Co., a large interest in which is owned by the Derby Oil Co., of Wichita, Kans., has leased the refinery at Russell, Kans., formerly owned and operated by the West Kansas Refining Co.

The plant now is owned by a new company composed of Russell business men, who purchased a large part of the holdings of C. H. Montgomery, former president of the West Kansas Refining Co.

The new company owning the plant is temporarily headed by C. A. Johnson, president; Charles E. Hall, vice president and J. E. Missimer, secretary-treasurer. A permanent organization will be formed at a meeting of stockholders to be held in the near future. Mr. Montgomery, who will own some stock in the new company, will not be actively connected with the operation of the plant.

The plant is practically new, having been completed and put in operation only last autumn. It has a capacity of 2,500 bbls. of crude daily which is obtained from the Russell Pool, 18 miles northwest of Russell. The refinery is equipped with tube stills and towers, a principle not in use at any other Mid-Continent refinery it is claimed.

ARGENTINA'S OIL IMPORTS

WASHINGTON, D. C., Apr. 26.—Imports of lubricating oils and greases to Argentina totaled 7,110,250 gallons, according to a report to the Department of Commerce from Sherwood H. Avery, assistant trade commissioner at Buenos Aires. This was an increase of 1,261,900 gallons over the 5,848,350 gallons imported during 1924. The United States is estimated to have supplied about 90 per cent of these imports, 6,413,400 gallons in 1925 and 5,522,000 gallons in 1924. England furnished most of the remainder, although Germany, Belgium and Italy marketed small quantities.

TANK WAGON PRICES IN 50 CITIES TURN SHARPLY UPWARD IN APRIL

Tank wagon prices of gasoline took a sharp turn upward during April. Following a period of several months, during which the jobbing market had been comparatively steady, general tank wagon advances over the country resulted in the average price May 1 being nearly a cent higher than on April 1.

Based on prices in 50 representative cities of the country compiled by The Oil and Gas Journal, the average posting on May 1 was 18.487 cents. This was an advance of 0.91 cent over the 17.577-cent average of April 1.

The tank wagon increases were a direct reflection of the stronger refined markets which developed in all refining centers during April, especially the latter half. The seasonal increase in consumption of gasoline is the cause of this rising market as at this time every year it climbs rapidly.

Practically all marketing territories were affected by the tank wagon advances. Only in the territories of the Standard Oil Co. of California, the Magnolia Petroleum Co. and the Standard Oil Co. of Kentucky were prices not advanced generally by May 1. Since May 1, however, the Standard Oil Co. of Kentucky has advanced postings throughout its territory, the southeastern states.

Eastern states had two increases during the month. Both the Standard Oil Co. of New Jersey and the Atlantic Refining Co. boosted prices the first week in addition to the advance by the former company on April 30. The Atlantic Refining Co. also has advanced again, the second increase, however, being since May 1.

Although until last month tank wagon prices this year have maintained a level below that of last year, the increases during April boosted the average on May 1, 1926, to 0.135 cents above the average on the same day of the previous year. The average on May 1 last year was 18.352 cents.

With the exception of an increase in Mississippi on April 1, which was included in the April 1 report, there were no changes in gasoline taxes during the months, the average remaining 2.43 cents.

Average Tank Wagon Prices in Fifty Cities

May 1	18.352
June 1	19.122
July 1	19.387
August 1	19.413
September 1	16.703
October 1	15.808
November 1	15.528
December 1	15.763
January 1, 1926	16.133
February 1	16.213
March 1	17.267
April 1	17.577
May 1	18.487

GASOLINE PRICES EFFECTIVE MAY 1, 1926

Table showing gasoline tank wagon prices as of May 1, 1926, exclusive of taxes, in 50 representative cities, including the amount and the date of changes since April 1, 1926. High and low prices and State taxes also given.

	Prices Apr. 1	April Changes				Chngs. May 1	Prices May 1	High and Low 1925		High and Low 1924		Taxes May 1, 1926
Birmingham, Ala..	18.0	....	....	....	....	....	18.0	20.0	13.0	20.0	13.0	2.0
Phoenix, Ariz.	22.0	....	....	....	....	....	22.0	20.0	18.0	20.0	16.0	3.0
Little Rock, Ark...	14.5	....	....	30 16.0	....	....	16.0	19.0	13.0	18.0	13.0	4.0
San Francisco, Cal.	16.0	....	....	....	....	....	16.0	15.0	13.0	15.0	11.0	2.0
Denver, Colo.	18.0	....	....	....	19.0	19.0	20.0	13.0	19.0	12.0	2.0
Hartford, Conn. ..	18.0	6 19.0	....	....	....	....	19.0	21.0	15.0	20.0	13.0	2.0
Dover, Del.	17.0	6 18.0	....	....	....	....	18.0	21.0	15.0	20.0	14.0	2.0
Jacksonville, Fla. .	17.0	....	....	....	....	....	17.0	19.0	12.0	19.0	12.0	4.0
*Atlanta, Ga.	19.0	....	....	....	....	....	19.0	21.0	14.0	19.0	11.0	3.5
Boise, Idaho	23.0	....	....	....	24.0	24.0	21.5	19.0	22.5	18.0	3.0
Peoria, Ill.	17.2	....	....	29 18.2	....	18.2	19.2	10.5	18.2	13.0	...
Chicago, Ill.	16.0	....	....	29 17.0	....	17.0	18.0	13.0	18.0	13.0	...
Indianapolis, Ind...	17.2	....	....	29 18.2	....	18.2	19.2	13.2	18.2	13.2	3.0
Des Moines, Iowa..	17.5	....	....	29 19.5	....	19.5	19.5	13.5	18.5	13.5	2.0
†Wichita, Kans....	16.3	5 14.8	....	29 15.8	....	15.8	18.8	8.8	17.8	12.8	2.0
Louisville, Ky. ...	18.0	....	....	....	....	18.0	19.0	12.0	19.0	12.0	5.0
New Orleans, La...	14.0	....	....	30 15.5	....	15.5	18.5	11.5	16.5	11.5	3.0
Augusta, Me.	19.0	....	....	....	20.0	20.0	22.0	15.0	19.0	13.0	3.0
Baltimore, Md. ...	16.0	8 17.0	....	30 18.0	....	18.0	19.0	13.0	19.0	13.0	2.0
Springfield, Mass..	18.0	6 19.0	....	....	....	....	19.0	21.0	15.0	20.0	13.0	...
Detroit, Mich.	17.8	....	....	29 18.8	....	....	18.8	19.8	13.8	18.8	13.8	2.0
Duluth, Minn.	18.5	....	....	29 19.5	....	....	19.5	20.5	13.5	19.2	14.5	2.0
Natchez, Miss.	16.5	....	....	....	....	....	16.5	18.5	11.5	18.5	11.5	4.0
Kansas City, Mo. .	16.9	....	....	29 17.9	....	17.9	18.9	12.9	17.9	11.9	3.0
Helena, Mont.	22.0	....	....	....	....	....	22.0	24.0	18.0	23.0	18.0	2.0
Omaha, Neb.	16.25	....	....	29 18.25	....	....	18.25	19.25	10.0	18.25	11.0	2.0
Reno, Nev.	19.5	....	....	....	....	....	19.5	18.5	16.5	18.5	14.5	4.0
Newark, N. J.	16.0	8 17.0	....	30 18.0	....	....	18.0	19.0	13.5	19.5	13.5	...
Albuquerque, N. M.	21.5	....	....	....	22.5	22.5	23.5	19.5	23.0	18.0	3.0
New York, N. Y...	19.0	....	....	....	20.0	20.0	22.0	15.0	20.0	14.0	...
Charlotte, N. C. ...	17.0	....	....	30 18.5	....	18.5	20.0	12.0	19.0	13.0	4.0
Fargo, N. D.	19.9	....	....	29 20.9	....	20.9	20.9	14.9	19.6	14.9	1.0
Cleveland, Ohio ...	19.0	....	....	....	....	....	19.0	18.5	15.0	20.0	15.0	2.0
Tulsa, Okla.	14.0	....	16 15.0	....	....	....	15.0	18.0	9.5	18.0	9.5	3.0
Portland, Ore.	16.0	....	....	....	....	....	16.0	15.0	13.0	16.0	12.0	3.0
‡Philadelphia, Pa..	17.0	6 18.0	....	....	....	....	18.0	21.0	15.0	20.0	14.0	2.0
Providence, R. I. .	18.0	6 19.0	....	....	....	....	19.0	22.0	15.0	20.0	13.0	1.0
Charleston, S. C. ..	17.0	....	....	30 18.5	....	....	18.5	20.5	12.5	19.0	12.5	5.0
Huron, S. D.	16.0	....	24 19.0	29 20.0	....	....	20.0	20.0	13.0	20.0	15.0	3.0
Memphis, Tenn. ..	16.0	1 16.0	12 15.5	30 17.0	....	....	17.0	18.0	10.5	18.0	12.0	3.0
Dallas, Tex.	14.0	....	....	....	....	....	14.0	18.0	10.0	17.0	9.0	1.0
Salt Lake City, Ut.	21.5	....	....	....	22.5	22.5	21.5	17.5	21.5	16.5	3.5
Burlington, Vt. ...	19.0	....	....	30	20.0	20.0	22.0	15.0	19.0	13.0	2.0
Norfolk, Va.	17.0	....	....	30 18.0	....	....	18.0	20.0	14.5	19.0	14.5	4.5
Washington, D. C..	16.0	8 17.0	....	30 18.0	....	....	18.0	19.0	14.0	19.0	14.0	2.0
Charleston, W. Va.	16.5	....	....	30 17.5	....	....	17.5	19.0	14.0	19.0	14.0	3.5
Milwaukee, Wis. ..	17.1	....	....	29 18.1	....	....	18.1	19.1	13.1	18.1	13.1	2.0
Casper, Wyo.	18.0	....	....	....	19.0	19.0	20.0	14.0	19.0	14.0	2.5
Seattle, Wash.	16.0	....	....	....	....	....	16.0	15.0	13.0	16.0	12.0	2.0
Minneapolis, Minn.	18.2	....	....	29 19.2	....	....	19.2	20.2	13.2	18.9	12.0	2.0
Average price	17.577						18.487	19.647	13.629	18.989	13.27	2.43

*Does not include ½-cent inspection fee. †Tank wagon price reduced ½ cent April 1, additional cent being discount on dumps of 50 gallons or more. ‡Tax paid by retail dealer.

PHILADELPHIA RATE PETITIONS ARE FILED

HARRISBURG, Pa., May 3. — Petitions of the National Petroleum Association, The Texas Company, the Gulf Refining Co., Sinclair Refining Co., and Standard Oil Co. of New Jersey to intervene in complaints of the Sun Oil Co. and Atlantic Refining Co. against rates for hauling products in Philadelphia and adjoining districts have been granted by the Pennsylvania Public Service Commission.

While dates have not been announced, hearings in the Sun and Atlantic cases probably will be held in Philadelphia.

NEBRASKA GASOLINE TAX

LINCOLN, Neb., May 3.—A total of $2,801,200 was collected by the state during the first year's operation of the 2-cents-a-gallon gasoline tax, the books on which have just been closed. State officials predict the receipts will reach the $3,000,000 mark this year.

TEXAS GASOLINE SALES

AUSTIN, Tex., May 3.—Gasoline sales taxes of $285,000 were paid by six refining companies in April, on March sales. The Gulf Refining Co. led with $67,867; Magnolia Petroleum Co., was second with $64,627; The Texas Company, $63,580; Pierce Petroleum Corp., $26,343; Humble Oil & Refining Co., $23,136; Texhoma Oil & Refining Co., $10,347.

TRANSFERRED TO TULSA

J. M. Bellamy, who has been bulk sales representative for the Sinclair Refining Co., in the Chicago district, has been transferred to Tulsa as assistant general agent in charge of Oklahoma and Arkansas bulk sales. Mr. Bellamy formerly was in Tulsa as sales manager of the Sinclair Oil & Gas Co., gasoline division.

NATURAL GASOLINE STORAGE

RIOW Constructed Shop Erected Tanks

Can be Easily Moved

Low Cost per Barrel to Build and Install

Quick Delivery and Installation

Graver Builds

Tanks
- Welded
- Riveted
- RIOW (Riveted, Inside & Outside Welded)
- Structural Supports
- Tower Tanks
- Standpipes
- Any Size Tanks Erected Anywhere

Refinery Equipment

Jenkins Cracking Process

Stacks-Breechings

General Steel Plate Construction

Water Softeners
- Hot Process
- Cold Process
- Zeolite
- Household

Filters—Pressure

Purifying Systems for Swimming Pools

GRAVER Corporation Founded 1857

EAST CHICAGO, INDIANA

NEW YORK Grand Cent. Term. | CHICAGO Steger Building | TULSA Atlas Life Bldg. | HOUSTON West Building

Brief Items for Plant Operators

TANK CAR REGULATION HEARING IS EXTENDED

WASHINGTON, D. C., May 3.—Proposal of the Interstate Commerce Commission that it take over and regulate the specifications for the construction of tank cars was presented at a hearing the past week before the commission of general tank car problems. At the request of the American Petroleum Institute representatives, private tank car interests, the American Railway Association committee and the Bureau of Explosives an extension of 60 days was granted to study the proposal.

The hearing was held primarily to discuss vapor pressure tests, safety valve tests, carding of tank cars with tanks or safety valves overdue for tests, removing dome covers from loaded tank cars while under pressure, tampering with dome openings of empty cars, elimination of bottom discharge valves, and placarding of loaded tank cars used for transportation of dangerous articles and empty tank cars previously loaded with dangerous articles.

While no definite action was taken at the hearing on these problems, it was the general opinion that the fundamental necessity was not a need of revised rules or regulations but rather a campaign to educate those who handle tank cars in the regulations already in effect.

The American Petroleum Institute representatives especially were opposed to any move which would have as its purpose the elimination of bottom outlet valves necessitating unloading of cars from the tops. It was pointed out that it was necessary in many cases to unload from the bottom and that any change in these specifications would result in an enormous expenditure by oil companies in re-equipping their cars.

As for placarding of cars, the Institute representatives opposed changes in regulations which would require separate placards for empty and loaded cars but expressed the opinion that more space might be reserved on the placards for proper designations of the contents of the cars.

LISBON GASOLINE CO. IS INSTALLING PLANT

SHREVEPORT, La., May 3.—The Lisbon Gasoline Co., Inc., recently organized, is installing its first natural gasoline plant. The plant, which is in the heart of the new Lisbon Field near El Dorado, Ark., will be composed of two units to handle 2,000,000 feet of gas daily. It is being erected by the F. E. Gilmore Co.

O. J. Dykes, until May 1 vice president of the Shreveport-El Dorado Pipe Line Co. of Shreveport, La., is in active charge of the Lisbon Gasoline Co. and G. W. James of El Dorado is vice president.

SINCLAIR RECOVERY AND SALES INCREASED

Recovery of gasoline from crude by the Sinclair Consolidated Oil Co. averaged 60.7 per cent in 1925 as shown by the annual report of the company. This represented an increase of 5.6 per cent over the average of 55.1 per cent recovery in 1924.

The company's report also showed that gasoline sales by the company increased 30 per cent during 1925. The figures stood at 601,958,164 gallons for 1925 and 462,767,096 gallons for 1924.

PLANT IN DIBRELL FIELD

Skelly Oil Co. has started operation of its new natural gasoline plant in the Dibrell Field, 11 miles northeast of Coleman, Tex. The new plant uses charcoal instead of absorption oil and is the company's sixth plant of that type. The plant has a capacity of 6,000,000 feet of gas daily and will be in charge of J. V. Vaden. It cost approximately $100,000.

NEW MEXICO CRUDES TO BAYTOWN REFINERY

HOUSTON, Tex., May 3.—High gravity crude from the Rattlesnake and Table Mesa Fields in New Mexico will be run through the Baytown refinery of the Humble Oil & Refining Co., according to officials of the company. The crude will be piped 100 miles from the fields to Gallup, N. Mex., from where it will be shipped in tank cars to Baytown and blended with crudes of low gravity now used at the plant. Gravity of the new crude runs as high as 65 A.P.I.

A 4-inch pipe line, now being laid by the Continental Oil Co. to Gallup, will handle the oil for the Humble Company.

NEW TOPPING PLANT

Construction work on the California Petroleum Corp.'s new topping plant at Watson is well under way and it should be in operation within a comparatively short time. The new plant will be known as refining unit No. 3 and will consist of two retorts, four condensers, four fractionating towers, three evaporators and two coolers. A 100-foot stack, a receiving house, three pan tanks of 2,500-bbl. capacity, two receiving tanks of 11,000 bbls. capacity and a water cooling tower with a capacity of 2,000 gallons per minute will take care of this new plant. The work on these units is progressing very rapidly and practically all pipe lines have been laid to pan tanks and cooling towers.

GOVERNMENT SCORES CRACKING CASE POINT

CHICAGO, May 3.—The Government won a point in its suit against several companies involved in the so-called "patent club," when judges in the United States District Court here today held that an amended bill in which fraud in securing certain patents is alleged, might be filed. This amended bill is directed at The Texas Company, which is alleged by the Government to have secured certain patents from the patent office through fraud. The defendants are given 20 days in which to reply to the bill.

The decision today was one more step in the Government suit filed in June, 1924, against The Texas Company, Standard Oil Co. of New Jersey, Standard Oil Co. of Indiana, and the Gasoline Products Co. as primary defendants in which it is alleged that the companies illegally pooled their patents covering the operation of several cracking processes.

Several weeks ago while testimony was being taken before a master in New York the Government sought to amend its bill so as to introduce evidence tending to show that there had been fraud in obtaining the Adams patents now controlled by The Texas Company. The master refused the Government permission to introduce the testimony and this action was appealed to the district judges, resulting in the decision announced today.

NEW ARKANSAS CITY UNITS

ARKANSAS CITY, Kans., May 3.—Two new units of the Dubbs cracking process will be completed and put in operation at the Roxana Petroleum Corp.'s refinery here by May 10. Thirty additional men have been employed to operate the stills. Six other Dubbs units already are in operation at the plants with a capacity of 8,000 bbls. daily.

NEW FAIRFAX PLANT

Phillips Petroleum Co. is building a natural gasoline plant in the new western Osage County oil pool north of Fairfax. The plant will contain three units capable of handling 3,000,000 feet of gas daily.

NEW PORTABLE PLANT

EL DORADO, Ark., May 3.—Atlantic Oil Producing Co. is installing a portable natural gasoline plant near here. The plant, which at present will include only one unit, is of the Southwestern type.

AMONG THE TECHNICAL MEN

As vice president in charge of the refinery department, Berry V. Stoll has had an important part in the expansion of the Stoll Oil Refining Co.'s refinery at Louisville, Ky., from a small skimmer to a complete plant.

Berry V. Stoll

Mr. Stoll has been in charge of the refining department of the company since he was discharged from the army after the World War. The plant then was just a small stripping plant but through Mr. Stoll's efforts a modern lubricating plant has been added making paraffin wax and all grades of lubricating oil. The refinery now has a capacity of 1,500 bbls. of crude daily, which is obtained through several company owned pipe lines, purchased through Mr. Stoll's efforts. The company bought out the old Warren Oil Co.'s pipe line in Lee County, Kentucky, which it has been operating five years, and also has put in lines in the new Tennessee fields.

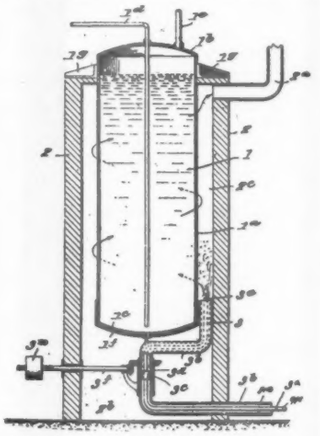
Mr. Stoll is one of five members of the Stoll family in charge of the company. C. C. Stoll is president; George Stoll, another vice president; Charles E. Stoll, secretary, and William A. Stoll, treasurer.

Berry V. Stoll was educated at Ohio Wesleyan University, Delaware, Ohio, which he attended until he enlisted in the army during the war. He was a captain of infantry and on the staff of the Seventeenth regular army division.

In addition to his work with the Stoll Oil Refining Co., Mr. Stoll is a director of the United Refining Co. of Warren, Pa.

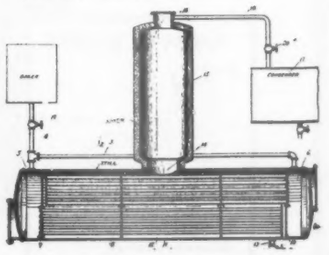
Recent Patents

1,576,563. Heating System for Oil Stills. Frank E. Wellman, Kansas City, Kans., assignor to the Kansas City Gasoline Co., Kansas City, Kans., a corporation of Kansas. Filed Dec. 17, 1921. Serial No. 523,062. 13 Claims. (Cl. 196—116.)

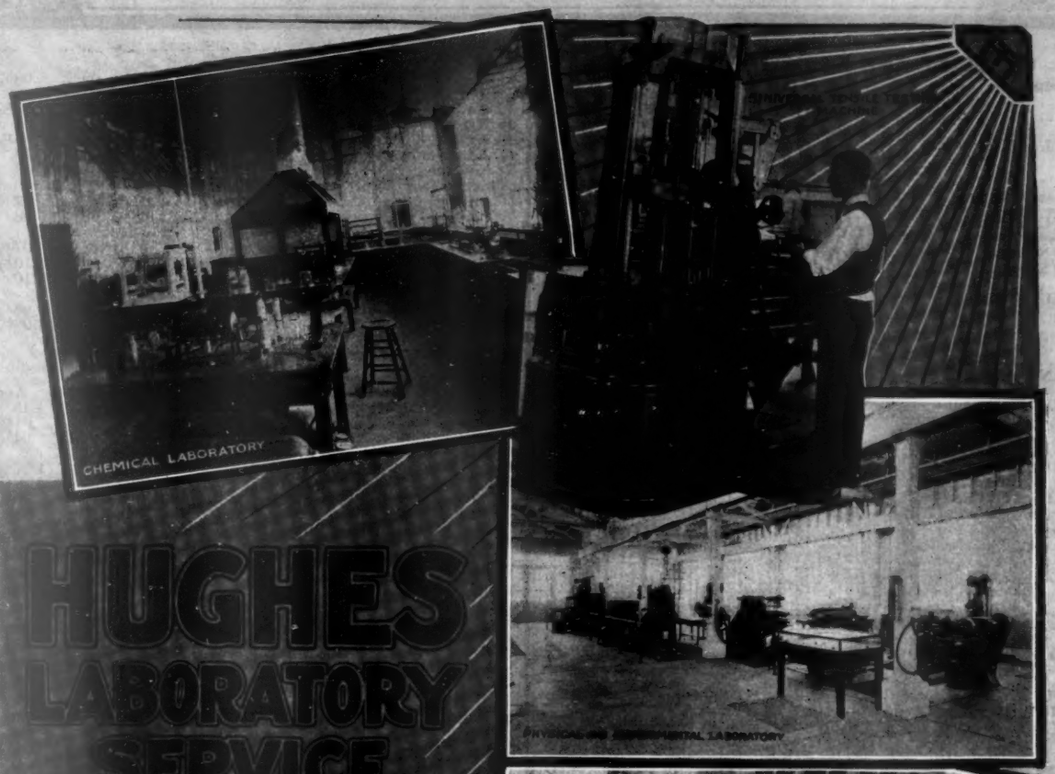


1. The combination of a vertical still, a furnace setting enclosing the same with an annular combustion space between the two, a stack adapted to receive products of combustion from the upper part of said space, means to produce localized combustion of fuel in the lower part of said space and means to constantly change the point of application of the resultant flame to the still wall.

1,576,742. Apparatus for Refining Oils. William Tee Hancock and Murat Boyle, Kansas City, Mo. Filed Oct. 8, 1923. Serial No. 667,231. 2 Claims. (Cl. 196—127.)



1. In a system for converting heavy hydrocarbon oils into lighter hydrocarbon oils, the combination with a horizontal still having perforate pipes running longitudinally thereof, crown sheets supporting the ends of the pipes, the crown sheets being spaced from the ends of the still to provide steam spaces at the respective ends thereof, steam inlets at the respective ends of the still, a separator chamber connected to the upper portion of the still, and a condenser connected to the top of the separating chamber.



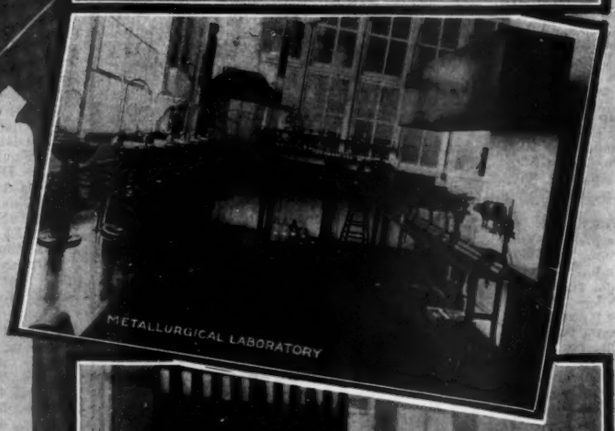
HUGHES LABORATORY SERVICE

The quality of Hughes Products reflects the exacting supervision of materials and processes maintained by the Hughes Laboratory Organization.

For many years Hughes Tool Company customers have benefited indirectly from this service.

We are now prepared to undertake a more direct service in the investigation of materials used in the producing and refining industry.

Complete equipment for physical and chemical analysis available.



HUGHES TOOL COMPANY

Main Office and Plant:

HOUSTON TEXAS

Branch Plants: Los Angeles, Calif. Oklahoma City, Okla.

Export Office: New York City

REFINERY AND CRUDE PRICES

Quotations on Principal Refined Products and Crude Petroleum Markets in All the American Oil Fields

GASOLINE AND NAPHTHA

OKLAHOMA (Group 3)—	May 4		Apr. 27		Apr. 20	
50-52 450 end point	.10½	.10¾	.09½	.09¾	.09¼	.09⅜
56-58 450 end point	.11	.11½	.10	.10½	.09¾	.09⅞
58-60 450 end point	.11¼	.11½	.10¼	.10⅜	.10	.10⅛
58-60 437 end point (U. S. Motor)	.11¼	.11½	.10½	.10⅝	.10¼	
60-62 400 end point	.12¼	.12½	.11½	.11¾	.11⅛	.11¼
64-66 375 end point	.12¾	.13	.12½		.12⅛	.12⅜
68-70 360 end point	.13¼	.13½	.12⅝	.13	.12¾	.13
KANSAS—						
58-60 437 end point (U. S. Motor)	.11⅝	.12	.11	.11¼	.10½	.10⅝
NORTH TEXAS—						
48-50 450 end point (Naphtha)	.10¼	.10½	.09⅜	.09½	.09	.09¼
50-52 450 end point (Naphtha)	.10½	.10⅝	.09½	.09⅝	.09⅜	.09¼
56-58 450 end point	.10⅞	.11⅛	.10		.09⅝	.09¾
58-60 437 end point (U. S. Motor)	.11¼	.11½	.10½	.10¾	.10½	
60-62 400 end point	.12¼	.12½	.11½	.11¾	.11¼	
64-66 390 end point	.12½		.12	.12⅛	.11¾	.12
64-66 375 end point	.12¾	.13	.12⅜	.12½	.12¼	.12⅜
68-70 360 end point	.13⅛	.13⅜	.12¾	.13	.12¾	.12⅞
NORTH LOUISIANA—						
56-58 450 end point	.11	.11¼	.10¼	.10½	.09⅞	.10
58-60 437 end point (U. S. Motor)	.11¼	.11⅝	.10⅝	.11	.10¼	.10½
68-70 360 end point	.13⅛	.13⅜	.12¾	.13	.12⅜	.12⅞
ARKANSAS—						
58-60 450 end point	.11½	.11¾	.10¾	.11	.10	.10¼
58-60 437 end point (U. S. Motor)	.11¾	.12	.11		.10⅜	.10½
64-66 375 end point	.13	.13¼	.12½	.12¾	.12¼	.12½
ROCKY MOUNTAIN STATES—						
*58-60 437 end point (U. S. Motor)	.14¼	.14½	.13½	.13¾	.13	.13¼
PENNSYLVANIA—						
52 Naphtha	.12¼	.12½	.11¾	.12	.11½	.11¾
54 Naphtha	.12½	.12¾	.12	.12¼	.11¾	.12
56 Naphtha	.12¾	.13	.12¼	.12½	.12	.12¼
58 Naphtha	.13¼	.13½	.12¾	.13	.12½	.12¾
60 Gasoline	.13¾	.14	.13½	.13¾	.13	.13¼
62 Gasoline	.14	.14¼	.13¾	.14	.13½	.13¾
64 Gasoline	.14½	.14¾	.14½	.14¾	.14	.14¼
66 Gasoline	.16	.16¼	.16	.16¼	.16	.16¼
68-70 Gasoline	.19	.19½	.19	.19½	.19	.19½
CALIFORNIA—						
54-58 437 end point (U. S. Motor) domestic	.12½	.13	.12½	.13	.12½	.13
CHICAGO DISTRICT (Based on Group 3)—						
50-52 450 end point (Naphtha)	.10½	.10¾	.09½	.09¾	.09	.09¼
56-58 450 end point	.11		.10	.10⅛	.09¾	.09⅞
58-60 437 end point (U. S. Motor)	.11¼	.11½	.10½	.10⅝	.10¼	.10⅜
60-62 400 end point	.12¼	.12½	.11½	.11⅝	.11¼	.11½
64-66 375 end point	.13		.12⅝	.12½	.12¼	.12½
68-70 360 end point	.13¼	.13¾	.13	.13¼	.13	.13¼

*Colorado points.

NATURAL GASOLINE

OKLAHOMA (Group 3)—	May 4		Apr. 27		Apr. 20	
Grade AA, 80-87.9, 375 e.p., rec. 90%	.10½	.11	.09	.09¼	.09	
Grade A, 72-9.9, 375 e.p., rec. 90%	.10½	.11	.09	.09¼	.09	
Grade BB, 84-92, 375 e.p., rec. 85%	.10	.10¼	.08¼	.08½	.08	.08⅛
Grade B, 76-83.9, 375 e.p., rec. 85%	.10	.10¼	.08¼	.08½	.08	.08⅛
Grade C, 80-90, 375 e.p., rec. 78%	.09½	.09¾	.08	.08¼	.07¾	.08
NORTH TEXAS—						
Grade AA, 80-87.9, 375 e.p., rec. 90%	.10½	.10¾	.09	.09¼	.09	.09⅛
Grade A, 72-79.9, 375 e.p., rec. 90%	.10½	.10¾	.09	.09¼	.09	.09⅛
Grade BB, 84-92, 375 e.p., rec. 85%	.10	.10¼	.08¼	.08½	.08	.08¼
Grade B, 76-83.9, 375 e.p., rec. 85%	.10	.10¼	.08¼	.08½	.08	.08¼
Grade C, 80-90, 375 e.p., rec. 70%	.09½	.09¾	.08	.08¼	.08	
NORTH LOUISIANA—						
Grade A, 72-79.9, 375 e.p., rec. 90%	.11	.11¼	.09¼	.09½	.09¼	.09½
Grade B, 76-83.9, 375 e.p., rec. 85%	.10¾	.11	.09	.09¼	.08¾	.09
Grade C, 80-90, 375 e.p., rec. 78%	.10¼	.10½	.08¾	.09	.08½	.08¾
CALIFORNIA—						
78-85 absorption, 360-390 end point	.15½	.16	.15½	.16	.16	.16½
78-84 compression, 350 end point	.15½	.16	.15½	.16	.16	.16½
CHICAGO DISTRICT (Based on Group 3)—						
Grade AA, 80-87.9, 375 e.p., rec. 90%	.10½	.10¾	.09	.09¼	.09	
Grade A, 72-79.9, 375 e.p., rec. 90%	.10½	.10¾	.09	.09¼	.09	
Grade BB, 84-92, 375 e.p., rec. 85%	.10¼	.10½	.08¼	.08⅝	.08	.08⅛
Grade B, 76-83.9, 375 e.p., rec. 85%	.10¼	.10½	.08¼	.08⅝	.08	.08⅛
Grade C, 80-90, 375 e.p., rec. 78%	.10	.10¼	.08	.08¼	.07¾	.08

MOTOR NATURAL GASOLINE (BLENDS)

OKLAHOMA (Group 3)—	May 4		Apr. 27		Apr. 20	
60-62 450 end point	.11	.11¼	.10¼		.09½	.09¾
64-66 437 end point	.11¼	.11½	.10¼		.09¾	.09⅞
NORTH TEXAS—						
64-66 437 end point	.11	.11¼	.10⅛	.10¼	.09¾	.10
PENNSYLVANIA—						
*60-62	.12¼	.12½	.12¼	.12½	.12¼	.12½
*64-66	.12½	.12¾	.12½	.12¾	.12⅛	.12¾
*66-68	.12¾	.13	.12¾	.13	.12⅝	.13
*68-70	.12¾	.13	.12¾	.13	.12¾	.13
CHICAGO DISTRICT (Based on Group 3)—						
60-62 450 end point	.10½	.10¾	.09½	.09¾	.09¼	.09½
64-66 437 end point	.10½	.11	.10	.10¼	.09¾	.10

*At Sistersville, W. Va.

BURNING OIL

KANSAS—	May 4		Apr. 27		Apr. 20	
41-43 water white Kerosene	.09¼	.09⅝	.08¼	.08½	.07½	.07⅝
OKLAHOMA (Group 3)—						
41-43 water white Kerosene	.09	.09½	.08¼		.07¼	.07½
42-44 water white Kerosene	.09½		.08⅝	.08½	.07½	.07⅝
NORTH LOUISIANA—						
41-43 prime white Kerosene	.09¼	.09½	.08¼	.08½	.07½	.07⅝
ROCKY MOUNTAIN STATES—						
*40-41 water white Kerosene	.12¼	.12½	.11¼	.11⅜	.10¼	.10⅜
NORTH TEXAS—						
41-43 water white Kerosene	.09	.09¼	.08	.08⅛	.07⅛	.07¼
ARKANSAS—						
41-43 water white Kerosene	.09½	.09¾	.08⅜	.08½	.07½	.07⅝
PENNSYLVANIA—						
43 Kerosene prime white	.09½	.09¾	.08¼	.08½	.08¼	.08½
45 Kerosene water white	.10	.10¼	.09	.09¼	.08¾	.09
46 Kerosene water white	.10¼	.10½	.09½	.09⅝	.09½	.09⅝
47 Kerosene water white	.10½	.10⅝	.10	.10¼	.10	.10¼
34 Neutral	.08	.08¼	.08	.08¼	.08	.08¼
34 Sundebloom Neutral	.09	.09¼	.09	.09¼	.09	.09¼
36 Miners' Neutral	.07	.07¼	.07	.07¼	.07	.07¼
300 Mineral Seal	.08¼	.08½	.08	.08¼	.07¾	.08
CALIFORNIA—						
38-40 water white (high burning test)	.07½	.08½	.07½	.08½	.07½	.08½
Engine distillate, 43-45 445 end point	.10¼	.10½	.10¼	.10½	.10¼	.10½
Engine distillate, 42-44 450 end point	.10	.10¼	.10	.10¼	.10	.10¼
CHICAGO DISTRICT (Based on Group 3)—						
41-43 water white Kerosene	.09¼	.09½	.08¼	.08½	.07⅜	.07½
42-44 water white Kerosene	.09½	.09⅝	.08½		.07½	

*Colorado points.

FUEL OILS

KANSAS—	May 4		Apr. 27		Apr. 20	
24-26 Fuel Oil	.1.45	1.55	1.45	1.50	1.50	1.55
32-36 Gas Oil	.04⅜	.04½	.04¼	.04⅜	.04¼	.04⅜
38-40 Distillate	.04⅝	.04¾	.04½	.04⅝	.04½	.04⅝
OKLAHOMA (Group 3)—						
Below 22 Fuel Oil (sellers' cars)	.1.30		1.27½	1.30	1.27½	1.32½
22-26 Fuel Oil (sellers' cars)	.1.32½	1.35	1.32½	1.35	1.32½	1.35
24-26 Fuel Oil (sellers' cars)	.1.40	1.42½	1.40		1.40	1.42½
26-30 Fuel Oil (sellers' cars)	.1.45	1.50	1.45	1.50	1.45	1.50
28-30 Fuel Oil (sellers' cars)	.1.50	1.60	1.55	1.60	1.55	1.60
32-36 Gas Oil (dark)	.04¼		.04½	.04¾	.04½	.04¾
32-36 Gas Oil (straw)	.04¼	.04⅜	.04¼	.04⅜	.04¼	.04⅜
36-38 Distillate	.04¼	.04⅜	.04⅜	.04½	.04⅜	.04½
38-40 Straw Distillate	.04⅝	.04¾	.04½	.04⅝	.04½	.04⅝
NORTH TEXAS—						
24-36 Fuel Oil (sellers' cars)	.1.37½	1.40	1.37½	1.40	1.42½	1.45
32-36 Gas Oil (straw)	.04	.04¼	.04⅛	.04¼	.04⅛	.04¼
38-40 Straw Distillate	.04⅜	.04½	.04⅜	.04½	.04⅜	.04½
NORTH LOUISIANA—						
18-20 Fuel Oil	.1.22½	1.25	1.20	1.25	1.17½	1.20
32-36 Gas Oil	.04⅛	.04¼	.04	.04½	.04¼	.04⅜
ARKANSAS—						
38-40 Distillate	.04¾	.05	.04¾	.05	.04¾	.05
32-36 Gas Oil	.04⅝	.04½	.04⅝	.04½	.04⅝	.04½
16-20 Refinery Fuel Oil	.1.20	1.22½	1.20		1.20	1.25
GULF COAST (South Texas)—						
Gas Oil	.05	.05¼	.05	.05¼	.05	.05¼
Fuel Oil	.1.65	1.70	1.65	1.70	1.65	1.70
PENNSYLVANIA—						
30-34 Fuel Oil	.06⅛	.06¼	.06	.06⅛	.05¾	.06
36-40 Fuel Oil	.06½	.06¾	.06⅝	.06½	.06¼	.06⅝
CALIFORNIA—						
33-35 Distillate	.04¾	.05	.04¾	.05	.04¾	.05
27-35 Distillate	.04	.04½	.04	.04½	.04	.04½
15-20 Fuel Oil (at tide water)	.1.00	1.04	1.00	1.04	1.00	1.04
27 plus Diesel	.1.15	1.19	1.15	1.19	1.15	1.19
CHICAGO DISTRICT (Based on Group 3)—						
24-26 Fuel Oil (sellers' cars) Group 3	.1.40	1.45	1.37½	1.40	1.40	1.45
22-26 Fuel Oil (sellers' cars)	.1.35	1.37½	1.32½	1.35	1.35	1.40
18-22 (El Dorado)	.1.30	1.32½	1.30	1.32½	1.30	1.35
18-20 (Smackover)	.1.12½	1.15	1.07½	1.10	1.07	1.10
32-36 Gas Oil	.04⅛	.04¼	.04⅛	.04¼	.04¼	.04⅜
36-38 Distillate	.04¼	.04⅜	.04¼	.04½	.04¼	.04⅜
38-40 Straw Distillate	.04⅝	.05	.04½	.04¾	.04½	.04⅝

LUBRICATING OILS AND WAX

OKLAHOMA (Group 3)—	May 4		Apr. 27		Apr. 20	
70-80 vis., 2½ color, 20-25 cold test	.06	.07	.06	.07	.06	.07
100 vis., 3 color, 20-25 cold test	.06½	.07	.06½	.07	.06½	.07
100 vis., 2 color, 20-25 cold test	.07	.07½	.07	.07½	.07	.07½
150 vis., 4 color, 20-25 cold test	.09¼	.09¾	.09¼	.09¾	.09¼	.09¾
150 vis., 3 color, 20-25 cold test	.09½	.10	.09½	.10	.09½	.10
180 vis., 4 color, 23-28 cold test	.10	.10½	.10	.10½	.10	.10½
180 vis., 3 color, 23-28 cold test	.10¼	.10½	.10¼	.10½	.10¼	.10½
200 vis., 4 color, 23-28 cold test	.11	.11½	.11	.11½	.11	.11½
200 vis., 3 color, 23-28 cold test	.11¼	.11½	.11¼	.11½	.11¼	.11½
220 vis., 4 color, 25-30 cold test	.14	.14½	.14	.14½	.14	.14½
220 vis., 3 color, 25-30 cold test	.14½	.15	.14½	.15	.14½	.15
240 vis., 4 color, 25-30 cold test	.14	.14½	.14	.14½	.14	.14½
240 vis., 3 color, 25-30 cold test	.14½	.15	.14½	.15	.14½	.15
280 vis., 4 color, 25-30 cold test	.15½	.16	.15½	.16	.15½	.16
280 vis., 3 color, 25-30 cold test	.16½	.17	.16½	.17	.16½	.17
180 vis., 5 color, 23-28 cold test	.09¾	.10¼	.09¾	.10½	.09¾	.10¼
200 vis., 5 color, 23-28 cold test	.10¾	.11¼	.10¾	.11½	.10¾	.11¼
220 vis., 5 color, 25-30 cold test	.14	.14½	.14	.14½	.14	.14½
240 vis., 5 color, 25-30 cold test	.13	.14	.13	.14	.13	.14
280 vis., 5 color, 25-30 cold test	.15½	.16	.15½	.16	.15½	.16
Cylinder Stocks:						
180-200 vis., S. R. green, 40-45 cold test	.08½	.11	.08½	.11	.08½	.11
190-200 vis., S. R. green, 40-45 cold test	.08	.08½	.08	.08½	.08	.08½
170-190 dark green, 40-45 cold test	.06	.06½	.06	.06½	.06	.06½
190-200 vis. @ 210 "D" Bright Stock	.33	.35	.33	.35	.33	.35
200-210 vis. @ 210 "E" Bright Stock	.30	.31	.30	.31	.30	.31
150 vis. @ 210 "E" Bright Stock	.27	.28	.27	.28	.27	.28
150 vis. @ 210 "D" Bright Stock	.28	.31	.28	.31	.28	.31
Waxes:						
122-124 White Crude Scale Wax	.05		.05		.04⅞	.05
PENNSYLVANIA—						
150, 3 color	.21½		.21½		.21½	
180, 3 color	.26		.26		.26	
200, 3 color	.28		.28		.28	
220, 3 color	.30		.30		.30	
600, steam refined	.15¾		.15¾		.15¾	
635, steam refined	.19½		.19½		.19½	
650, steam refined	.21		.21		.21	
600, Pennsylvania flash	.26½		.26½		.26½	

REFINERY AND CRUDE PRICES

Quotations on Principal Refined Products and Crude Petroleum Markets in All the American Oil Fields

630, Pennsylvania flash	.34		.35		.35	
*550, E filtered	.19½		.19½		.19½	
600, E filtered	.20¼		.20¼		.20¼	
*600, E filtered	.21¼		.21¼		.21½	
600, D filtered	.26¾		.26¾		.26¾	
550, E filtered	.18½	.18¾	.18½	.18¾	.18½	.18¾
550, D filtered	.22¼	.22½	.22¼	.22½	.22¼	.22½
Pennsylvania Bright Stock	.39		.38		.38	
122-124 White Crude Scale Wax	.05⅛	.05¼	.05⅛	.05¼	.05⅜	.05½
†124-126 White Crude Scale Wax	.05¼	.05⅜	.05¼	.05⅜	.05½	.05⅝

*At Warren, Pa. †At New York City.

GULF COAST (South Texas)—						
Zero Black	.06	.07	.06	.07	.06	.07
No. 2 color, 100 vis., pale oil	.07½	.08	.07½	.08	.07½	.08
No. 2½ color, 150 vis., pale oil	.10	.10½	.10	.10½	.10	.10½
No. 3 color, 200 vis., pale oil	.11	.11½	.11	.11½	.11	.11½
No. 3½ color, 300 vis., pale oil	.13	.13½	.13	.13½	.13	.13½
No. 3¾ color, 500 vis., pale oil	.15	.15½	.15	.15½	.15	.15½
No. 4 color, 750 vis., pale oil	.19	.20	.18½	.19	.18½	.19
No. 1½ plus color, 150 vis., pale filtered	.22		.22		.22	
No. 2 plus color, 200 vis., pale filtered	.23½		.23½		.23½	
No. 2 color, 300 vis., pale filtered	.27½		.27½		.27½	
No. 2½ color, 500 vis., pale filtered	.31½		.31½		.31½	
No. 2½ color, 750 vis., pale filtered	.41½		.41½		.41½	
No. 5 to 6 color, 200 vis., red oil	.09½	.10	.09½	.10	.09½	.10
No. 5 to 6 color, 300 vis., red oil	.11½	.12	.11½	.12	.11½	.12
No. 5 to 6 color, 500 vis., red oil	.13	.13½	.13	.13½	.13	.13½
No. 5 to 6 color, 750 vis., red oil	.17	.18	.17	.18	.17	.18
CALIFORNIA—						
130 pale, 2½-3 color	.10	.11½	.10	.11½	.10	.11½
200 vis., 2½-3 color	.13½	.14½	.13½	.14½	.13½	.14½
300 vis., 3 -3½ color	.15	.16	.15	.16	.15	.16
350 vis., 3½-4 color	.16½	.17½	.16½	.17½	.16½	.17½
400 vis., 3½-4 color	.18	.19	.18	.19	.18	.19
Red Neutrals:						
200 vis., 4½-5 color	.12	.13	.12	.13	.12	.13
300 vis., 5 -6 color	.13	.14	.13	.14	.13	.14
400 vis., 5 -6 color	.15	.16	.15	.16	.15	.16
500 vis., 4½-5 color	.18	.19	.18	.19	.18	.19
500 vis., 6 -6½ color	.16	.17	.16	.17	.16	.17
600 vis., 6½ plus color	.17	.18	.17	.18	.17	.18

Note: Bright stocks are not manufactured commercially on the Pacific Coast.

NEW YORK DOMESTIC MARKET

Bayonne Refinery Prices:	May 4	Apr. 27	Apr. 20
U. S. Motor Gasoline, 58-60 437	.13½	.13½	.13½
*Bunker Oil, 14-16 Be.	1.75	1.75	1.75
*Diesel Oil, New York City	2.41½	2.41½	2.30
Furnace Oil, New York City	.10	.10	.10
Gas Oil, 28 plus	.06½	.06½	.05¾
41-43 Kerosene prime white	.09	.08¾	.08½

*Lighterage 6.5c a barrel extra.

NEW YORK EXPORT PRICES

Motor Gasoline:	May 4	Apr. 27	Apr. 20
58-60 Be. gravity, in cases	.28.90	.28.40	.28.40
Standard white Kerosene, in cases	.18.65	.18.40	.18.15
Water white Kerosene, in cases	.19.90	.19.90	.19.90
Export Gasoline, 64-66 Be.	.16½	.16½	.16½
†Lubricating Oils (in bulk):			
Cylinder Stock, light filtered, 60 s.r.	.29	.29	.29
No. 5 Bright Stock, .897 spec. grav.	.40	.40	.40
No. 1 White Neutral, .878 spec. grav.	.35	.35	.35
Pale Oil, "25" .898 spec. grav.	.12	.12	.12
Pale Oil, "28" .892 spec. grav.	.07½	.07½	.07½
No. 3 red oil, 160 vis., 7 color	.10¾	.10¾	.10¾
No. 2 red oil, .903 spec. grav.	.11½	.11½	.11½
No. 1 red oil, .905 spec. grav., 265 vis.	.13	.13	.13
Polar red oil, .903 spec. grav., 295 vis.	.13½	.13½	.13½
Paraffin Wax:			
120-122 a.m.p., per lb.	.05⅞	.05⅞	.05⅞
125-127 a.m.p., per lb.	.06	.06	.06
130-132 a.m.p., per lb.	.06¼	.06¼	.06¼
135-137 a.m.p., per lb.	.06⅜	.06⅜	.06⅜
Petrolatum, in bbls., car load lots, per lb.:			
Amber	.03⅜	.03⅜	.03⅜
Light amber	.03⅝	.03⅝	.03⅝
Cream	.05¾	.05¾	.05¾
Lily white	.08	.08	.08
Snow white	.09½	.09½	.09½

†All lub prices in barrels.

LOS ANGELES EXPORT PRICES

	May 4		Apr. 27		Apr. 20	
Kerosene water white	.05½	.06½	.05½	.06½	.05½	.06½
U. S. Motor Gasoline, 54-56 437 e.p.	.11	.11¼	.11	.11¼	.11	.11¼

CRUDE OIL PRICES

OKLAHOMA, KANSAS AND NORTH TEXAS

***Prairie Oil & Gas Co.**

(Oklahoma, Kansas and North and East Central Texas)

28° to 28.9°	$1.40
29° to 29.9°	1.48
30° to 30.9°	1.56
31° to 31.9°	1.64
32° to 32.9°	1.72
33° to 33.9°	1.80
34° to 34.9°	1.88
35° to 35.9°	1.96
36° to 36.9°	2.04
37° to 37.9°	2.12
38° to 38.9°	2.20
39° to 39.9°	2.28
40° to 40.9°	2.36
41° to 41.9°	2.44
42° to 42.9°	2.52
43° to 43.9°	2.60
44° to 44.9°	2.68
45° to 45.9°	2.76
46° to 46.9°	2.84
47° to 47.9°	2.92
48° to 48.9°	3.00
49° to 49.9°	3.08
50° to 50.9°	3.16
51° to 51.9°	3.24
52° and above	3.32

*Other major purchasers except as noted below.

Champlin Refining

(Garber and Tonkawa)

Schedule based on Prairie Oil & Gas Co. paying 10 cents additional for each grade of crude above 38° gravity.

Humble Oil & Refining Co.

(North and East Central Texas, Ranger, Mexia, Powell, Richland, Wortham, Currie, Moran, Big Lake and Lytton Springs)

Same prices as Prairie Oil & Gas Co. schedule.

Magnolia Petroleum Co.

(Oklahoma, Kansas and North and East Central Texas, except Corsicana heavy, and Lytton Springs of South Central Texas)

Below 28°	$1.20

Other grades same as Prairie Oil & Gas Co.

Iatan	$1.15
Corsicana heavy	1.15

(Panola County)

34° to 34.9°	$1.70
35° to 37.9°	1.85
38° and above	2.00

Texhoma Oil & Refining Co.

(Wichita Falls, Tex., District)

Below 32°	$1.88
32° to 32.9°	1.94
33° to 33.9°	2.00
34° to 34.9°	2.06
35° to 35.9°	2.12
36° to 36.9°	2.18
37° to 37.9°	2.25
38° to 38.9°	2.30
39° to 39.9°	2.36
40° to 40.9°	2.42
41° to 41.9°	2.48
42° to 42.9°	2.54
43° to 43.9°	2.60
44° and above	2.69

Gypsy Oil Co.

(Bristow, Glenn Pool, Morris and Perryman, Okla.)

25° to 25.9°	$1.16
26° to 26.9°	1.24
27° to 27.9°	1.32

Other grades same as Prairie Oil & Gas Co.

TEXAS PANHANDLE

Kay County Gas Co.

***Magnolia Petroleum Co.**

Below 31°	$1.20
31° to 33.9°	1.35
34° to 36.9°	1.55
37° to 39.9°	1.70
40° and above	1.75

*Magnolia Petroleum Co. pays only $1 for crude below 31 gravity.

GULF COAST

***Humble Oil & Refining Co.**

Grade A	$1.50
Grade B—	
Below 25°	1.40
25° to 25.9°	1.45
26° to 26.9°	1.50
27° to 27.9°	1.55
28° to 28.9°	1.60
29° to 29.9°	1.65
30° to 30.9°	1.70
31° to 31.9°	1.75
32° to 32.9°	1.80
33° to 33.9°	1.85
34° to 34.9°	1.90
35° and above	1.95
Sour Lake (36° gravity) (The Texas Company)	1.79
Boling	1.50
High Island	1.40

*And other major purchasers, including The Texas Company, and the Sun Oil Co. High Island crude posted by the Sun Oil Co.

SOUTH CENTRAL AND SOUTHWEST TEXAS

***Magnolia Petroleum Co.**

Luling (contract)	$1.20
Mirando (Webb, Jim Hogg and Zapata Counties)	1.15
Rockdale-Minerva (Milam County)	1.25
Thrall	1.00
Callihan (Live Oak and McMullen Counties)	1.65
§Lockhart (Lytton Springs)	

Somerset (Grayburg Refining Co.)

28° to 28.9°	1.20
29° to 29.9°	1.30
30° to 30.9°	1.56
31° to 31.9°	1.64
32° to 32.9°	1.72
33° to 33.9°	1.80
34° to 34.9°	1.88
35° to 35.9°	1.96
36° to 36.9°	2.04
37° to 37.9°	2.12
38° and above	2.20

*Texpata Pipe Line Co. also posts in Mirando Field paying same prices as Magnolia Petroleum Co. Crown Central Petroleum Co. pays $1.20 for Mirando crude.

§Lockhart prices same as for North and East Central Texas. Lockhart posted by Magnolia Petroleum Co. and Humble Oil & Refining Co.

ARKANSAS AND NORTH LOUISIANA

Standard Oil Co. of Louisiana

Caddo below 32°	$1.85
32° to 34.9°	2.00
35° to 37.9°	2.10
38° and above	2.20
Homer below 31°	1.60
31° to 32.9°	1.75
33° to 34.9°	1.85
35° and above	1.95
Haynesville below 33°	1.75
33° and above	1.85
El Dorado below 33°	1.75
33° and above	1.85
Bull Bayou, 32° to 34.9°	1.70
35° to 37.9°	1.85
38° and above	2.00
Cotton Valley	1.10
DeSoto	2.05
Crichton	1.85
Bellevue	1.50
Smackover, below 24°	1.00
24° to 24.9°	1.25
25° to 25.9°	1.30
26° to 26.9°	1.35
27° and above	1.40
*Stephens, Ark., below 26°	1.30
26° and above	1.50
**Calion (East El Dorado)	.95
§Urania	1.30

Other companies posting in these fields are: Gulf Pipe Line Co.; Atlantic Oil Producing Co. in Homer, Haynesville and Smackover; The Texas Company in Caddo, Bull Bayou, DeSoto, Crichton and Smackover.

*Posted by the Atlantic Oil Producing Co. **Posted by the Gulf Pipe Line Co. §Posted by the Louisiana Oil Refining Corp.

ROCKY MOUNTAIN STATES

Ohio Oil Co.—Midwest Refining Co.

Rock Creek (Wyo.)	$2.00
Salt Creek—	
29° to 29.9°	1.48
30° to 30.9°	1.56
31° to 31.9°	1.64
32° to 32.9°	1.72
33° to 33.9°	1.80
34° to 34.9°	1.88
35° to 35.9°	1.96
36° to 36.9°	2.04
37° and above	2.12
Big Muddy	2.00
Mule Creek	1.50
Grass Creek, light	2.15
Grass Creek, heavy	.90
Elk Basin	2.15
Lance Creek	2.15
Osage	2.15
Lost Soldier (contract)	1.10
Greybull-Torchlight	1.90
Hamilton Dome	1.35
Cat Creek (Mont.)	2.15
Sunburst (Mont.)	1.15
Florence (Colo.)	1.35
Artesia	1.70
Hogback (N. M.)	2.20

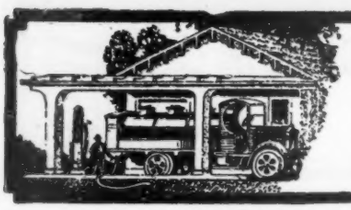
Note: Salt Creek, Osage, Cat Creek and Hogback posted by Midwest Refining Co., and the remainder by the Ohio Oil Co. Both companies post Grass Creek light and Elk Basin.

EASTERN STATES

Joseph Seep Purchasing Agency

Penna Grade Oil in New York Transit Lines (New York)	$3.65
Bradford District Oil in National Transit Lines (Pennsylvania)	3.65
Penna Grade Oil in National Transit Lines (Pennsylvania)	3.55
Penna Grade Oil in Southwest Pa. Pine Lines (Pennsylvania)	3.55
Penna Grade Oil in Eureka Pipe Line Lines (West Virginia)	3.50

(Continued on Page 200)



TANK WAGON MARKETS

Tank wagon quotations for gasoline and keronese in United States as furnished by the larger marketing concerns, May 4.

ALL TANK WAGON AND SERVICE STATION QUOTATIONS INCLUDE TAXES

STANDARD OIL CO. (INDIANA)

Main Service Station Price

	Gasoline			Kero.
	Tank wagon	Service station	Inclds tax of	Tank wagon
Chicago Dist.—				
†Less than 100 gals.	18.0	20.0	...	14.0

Tank wagon prices on April 19, 1922; g. up 1½c; May 8, up 1c; June 27, g. and k. up 1c; July 19, g. down 2c, k. down 1c; Oct. 10, g. down 2c; Oct. 21, g. down 1c; Feb. 5, 1923, g. up 1c; Feb. 20, g. up 1c; Aug. 14, g. down 6.6c; Oct. 4, k. down 1½c; Nov. 26, k. down 1.4c; Dec. 20, g. up 2c; Jan. 12, 1924, g. up 2c, k. up 1c; Feb. 5, g. up 2c, k. 1c; July 18, g. down 1c; July 30, g. and k. down 1c; Sept. 12, g. down 2c; Jan. 23, 1925, g. up 1c; Jan. 26, g. up 1c; Jan. 31, g. up 1c; Feb. 12, g. up 2c, k. up 1c; April 19, g. down 1c; July 14, g. up 1c; Aug. 26, g. down 2c, k. down 1c; Sept. 1, g. down 1c; Feb. 4, 1926, g. up 1c, k. up 1c; April 16, 1926, k. up 1c; April 24, 1926, k. up ½c; April 29, 1926, g. up 1c, k. up ½c.

Decatur, Ill. ..	18.2	20.2	...	14.5
East St. Louis.	17.1	19.35	...	13.6
Joliet	18.4	20.4	...	14.7
Peoria	18.2	20.2	...	14.5
Quincy	18.2	20.2	...	14.3
Davenport, Ia..	20.5	22.5	2.0	14.9
Des Moines ...	21.5	23.5	2.0	14.9
Keokuk	21.5	23.5	2.0	14.9
Sioux City	20.0	22.0	2.0	14.5
Duluth, Minn. .	21.5	23.5	2.0	15.6
Minneapolis ...	21.2	23.2	2.0	15.6
La Crosse, Wis.	21.2	23.2	2.0	15.1
Milwaukee	20.1	22.1	2.0	14.3
Madison	20.2	22.2	2.0	14.5
Detroit, Mich. .	20.8	22.8	2.0	15.2
Grand Rapids .	20.7	22.7	2.0	15.1
Saginaw	20.9	22.9	2.0	15.3
Evansville, Ind.	20.6	23.0	3.0	14.5
Fort Wayne ...	21.4	23.4	3.0	14.9
Indianapolis ...	21.2	23.2	3.0	14.6
South Bend ...	21.4	23.4	3.0	14.9
Fargo, N. D. ..	21.9	23.9	1.0	17.6
Huron, S. D. ..	23.0	25.0	3.0	16.1
Sioux Falls	22.5	24.5	3.0	15.6
*K. C., Mo.	20.9	22.9	3.0	13.3
*Springfield ..	20.8	22.8	3.0	14.2
*St. Louis	19.6	21.9	2.5	14.0
*St. Joseph	19.5	21.5	2.5	13.9
‡Wichita, Kan..	18.8	20.8	2.0	13.3
Bartlesville, Ok.	19.8	22.8	3.0	14.3
Memphis, Tenn.	20.0	23.0	3.0	15.5
Chattanooga ..	22.0	25.0	3.0	16.0
Knoxville	22.0	25.0	3.0	16.5
Nashville	21.0	24.0	3.0	16.0
Bristol	22.5	25.5	3.0	16.0
Little Rock, Ark	20.0	23.0	4.0	14.5

*State tax is 2c. Remainder is city tax.
†Quantity price on more than 100 gallons, 16.0.
‡At all Kansas points a discount of 1 cent a gallon is allowed from the tank wagon postings on dumps of 50 gallons or more.

The following monthly rebate system is effective on tank wagon schedules throughout the territory of Standard Oil Co. of Indiana: Over 750 gallons, ½c; over 2,000 gallons, ¾ cent; over 3,000 gallons, 1 cent; over 6,000 gallons, 1¼ cents; over 10,000 gallons, 2 cents. If quantity bought during the year is equal to 12 times the monthly agreed purchases the discount will be paid or credited on the entire quantity less monthly payments. Service station customers will receive discount of 1 cent a gallon on purchases amounting to 200 gallons a month or 2,400 gallons a year; and 2 cents a gallon on 600 gallons a month or 7,200 gallons a year.

SOUTHWESTERN DISTRICT

***Magnolia Petroleum Co.**

	Gasoline			Kero.
	Tank wagon	Service station	Inclds tax of	Tank wagon
Dallas, Tex. ..	15.0	17.0	1.0	13.0
Fort Worth ...	14.0	15.0	1.0	13.0
Houston	16.0	18.0	1.0	13.0
San Antonio ...	17.0	17.0	1.0	13.0
El Paso	18.0	18.0	1.0	14.0
Texarkana	18.0	21.0	1.0	13.5
Muskogee, Ok...	17.0	20.0	3.0	13.0
Oklahoma City.	17.0	20.0	3.0	13.0
Tulsa	18.0	21.0	3.0	12.0
Little Rock	20.0	23.0	4.0	15.0
Ft. Smith, Ark.	20.0	23.0	4.0	15.0

*The following is the schedule of discounts on gasoline adopted by the Magnolia Petroleum Co. in Texas sales and the discounts are graded according to gallonage: Over 750 gallons a month, ½ cent; over 2,000 gallons, ¾ cent; over 3,000 gallons, 1 cent; over 4,500 gallons, 1¼ cents; over 6,000 gallons, 1½ cents; over 8,000 gallons, 1¾ cents; over 10,000 gallons, 2 cents. If the quantity bought during the year is 12 times the monthly agreed purchases, the discount will be paid or credited on the entire quantity for the year less any monthly purchases.

The schedule on service station deliveries is: Over 200 gallons a month, 1 cent; over 300 gallons a month, 1½ cents; over 400 gallons, 1½ cents; over 500 gallons, 1¾ cents; over 600 gallons, 2 cents. The same rule applies for annual purchases as in the tank wagon discounts.

CENTRAL SOUTH DISTRICT

Standard Oil Co. (Louisiana)

	Gasoline			Kero.
	Tank wagon	Service station	Inclds tax of	Tank wagon
*New Orleans .	18.5	21.5	3.0	13.5
Alexandria . ..	18.0	21.0	2.0	14.5
Baton Rouge ..	17.0	20.0	2.0	13.0
LaFayette	18.0	21.0	2.0	14.0
Lake Charles ..	18.5	21.5	2.0	14.5
Shreveport, La.	17.0	20.0	2.0	13.5

*Tax of 3 cents includes city tax of 1 cent.

SOUTHERN DISTRICT

Standard Oil Co. (Kentucky)

	Gasoline			Kero.
	Tank wagon	Service station	Inclds tax of	Tank wagon
Atlanta, Ga. ..	24.0	27.0	3.5	18.0
Augusta	24.0	27.0	3.5	18.0
Macon	24.0	27.0	3.5	18.0
Savannah	21.0	24.0	3.5	16.0
Birm'gham, Ala	21.0	24.0	3.0	17.5
Mobile	20.0	23.0	2.0	16.0
*Montgomery...	22.0	25.0	3.0	18.5
Clarksdale, Miss	22.0	25.0	4.0	15.5
Jackson	22.0	25.0	4.0	14.5
Natchez	21.5	24.5	4.0	15.0
Vicksburg	21.5	24.5	4.0	15.0
Jack'ville, Fla..	22.0	25.0	4.0	16.0
Miami	24.0	27.0	4.0	17.5
Pensacola	22.0	25.0	4.0	16.5
Tampa	22.0	25.0	4.0	16.0
Covington	24.0	27.0	5.0	17.0
Louisville	24.0	27.0	5.0	16.0
Lexington, Ky..	23.0	26.0	5.0	17.0

*In addition to the state tax of 2 cents on gasoline, Montgomery has city tax of 1 cent on gasoline and ½ cent on kerosene.

PENNSYLVANIA-DELAWARE AND PART NEW ENGLAND

Atlantic Refining Co.

	Gasoline			Kero.
	Tank wagon	Service station	Inclds tax of	Tank wagon
*Pittsburgh, Pa.	19.0	24.0	...	16.0
*Philadelphia..	19.0	24.0	...	16.0
*Scranton	19.0	24.0	...	16.0
*Allentown	19.0	24.0	...	16.0
Altoona	19.0	24.0	...	16.0
*Erie	19.0	24.0	...	16.0
Dover, Del. ...	21.0	24.0	2.0	16.0
Wilmington ...	21.0	24.0	2.0	16.0
Springf'd, Mass.	20.0	23.0	...	16.0
Worcester	20.0	23.0	...	16.0
Boston	20.0	23.0	...	16.0
Providence, R.I.	21.0	24.0	1.0	16.0
Hartford, Conn.	22.0	25.0	2.0	15.0
New Haven ...	22.0	25.0	2.0	16.0

*Pennsylvania tax of 2 cents is collected by the dealer and paid by him direct to the State.

OHIO

Standard Oil Co. (Ohio)

	Gasoline			Kero.
	Tank wagon	Service station	Inclds tax of	Tank wagon
All Ohio points	21.0	23.0	2.0	14.0

NEW YORK AND PART OF NEW ENGLAND DISTRICT

Standard Oil Co. (New York)

	Gasoline			Kero.
	Tank wagon	Service station	Inclds tax of	Tank wagon
Albany, N. Y. .	20.0	....	....	17.0
*New York ...	20.0	....	...	17.0
Buffalo	20.0	....	...	17.0
Rochester	18.0	....	...	17.0
Syracuse	20.0	....	...	17.0
Boston, Mass...	20.0	....	...	17.0
Providence, R.I.	21.0	....	1.0	17.0
Augusta, Me. ..	23.0	....	3.0	17.0
Manchester, N. H.	22.0	....	2.0	17.0
Burlington, Vt.	22.0	....	2.0	17.0

*Price in steel barrels.
Note: Standard Oil Co. of New York does not generally quote service station price in its territory. In most cases the service station price is 2 or 3 cents higher than tank wagon price.

ATLANTIC COAST DISTRICT

Standard Oil Co. (New Jersey)

	Gasoline			Kero.
	Tank wagon	Service station	Inclds tax of	Tank wagon
Atlantic City ..	18.0	....	...	15.5
Newark, N. J...	18.0	20.0	...	15.5
Annapolis, Md.	20.0	....	2.0	15.5
Baltimore	20.0	23.0	2.0	15.5
Cumberland	20.0	23.0	2.0	15.5
Washington ...	20.0	23.0	2.0	15.5
Danville, Va. ..	22.5	....	4.5	15.5
Norfolk	22.5	25.5	4.5	15.5
Petersburg	22.5	....	4.5	15.5
Richmond	22.5	25.5	4.5	15.5
Roanoke	22.5	25.5	4.5	15.5
Charleston, W. Va.	21.0	24.0	3.5	15.5
Keyser	21.5	....	3.5	15.5
Parkersburg ..	21.0	24.0	3.5	15.5
Wheeling	21.0	24.0	3.5	15.5
Charlotte, N. C.	22.5	25.5	4.0	15.5
Hickory	22.5	....	4.0	15.5
Mt. Airy	22.5	....	4.0	15.5
Salisbury	22.5	....	4.0	15.5
Charleston, S.C.	23.5	26.5	5.0	15.5
Columbia	23.5	26.5	5.0	15.5

ROCKY MOUNTAIN DISTRICT

Continental Oil Co.

	Gasoline			Kero.
	Tank wagon	Service station	Inclds tax of	Tank wagon
Denver, Colo. ..	21.0	21.0	2.0	17.5
Pueblo	20.0	20.0	2.0	17.5
Casper, Wyo. ..	21.5	23.5	2.5	16.0
Cheyenne	22.5	24.5	2.5	17.5
Butte, Mont. ..	22.0	22.0	2.0	18.5
Helena	24.0	26.0	2.0	19.5
Salt Lake, Utah	26.0	28.0	3.5	19.0
Boise, Idaho ..	27.0	29.0	3.0	21.0
Albuquerque, N. Mex.	25.5	28.5	3.0	21.0

CALIFORNIA

***Standard Oil Co.-Union Oil Co.**

Gravity—	Long Beach Huntington Beach Richfield Brea-Olinda Rosecrans-Dom'gues Torrance-Inglewood	Whittier La Habra Montebello	Kern River Newhall-McKittrick Midway-Sunset Elk Hills Lost Hills Belridge	Coyote	Santa Fe Springs	Coalinga	Wheeler Ridge	Santa Maria Ventura Salt Lake
14°	.85	.85	.75	.85	....	.75	.75	.85
15°	.87	.85	.75	.85	....	.75	.75	.85
16°	.90	.85	.75	.85	....	.75	.75	.85
17°	.94	.85	.75	.85	....	.75	.75	.85
18°	.98	.86	.75	.86	....	.75	.75	.85
19°	1.04	.87	.75	.87	....	.76	.75	.85
20°	1.10	.89	.82	.90	.89	.79	.78	.90
21°	1.16	.91	.90	.98	.91	.86	.81	.97
22°	1.22	.94	1.00	1.06	.94	.93	.85	1.04
23°	1.28	.97	1.11	1.14	.97	1.00	.89	1.11
24°	1.34	1.01	1.22	1.22	1.02	1.07	.93	1.18
25°	1.40	1.05	1.33	1.30	1.08	1.14	.97	1.25
26°	1.46	1.09	1.44	1.38	1.16	1.21	1.01	1.32
27°	1.52	1.13	1.55	1.46	1.24	1.28	1.05	1.39
28°	1.58	1.17	1.66	1.54	1.32	1.35	....	1.46
29°	1.64	1.21	1.77	1.62	1.40	1.42	....	1.53
30°	1.70	1.25	1.88	1.70	1.48	1.49	....	1.60
31°	1.76	....	1.99	....	1.60	1.56	....	1.67
32°	1.84	....	2.10	....	1.72	1.63	....	1.73
33°	1.92	....	2.21	....	1.84	1.70	....	1.79
34°	2.00	....	2.32	....	1.96	1.77	....	1.85
35°	2.08	....	....	....	2.08	1.84	....	1.92
36°	2.16	....	....	....	2.16	....	....	....
37°	2.24	....	....	....	2.24	....	....	....
38°	2.34	....	....	....	2.34	....	....	....
39°	2.44	....	....	....	2.44	....	....	....
40°	2.54	....	....	....	....	....	....	....
41°	2.64	....	....	....	....	....	....	....
42°	2.74	....	....	....	....	....	....	....

*Column 2—Long Beach and Huntington Beach crudes, 14 to 32 degrees, inclusive; Richfield and Brea-Olinda, 14 to 30 degrees; Torrance and Inglewood, 14 to 28; Domingues, 24 to 42 degrees. Rosecrans crude ranges from 14 to 43 degrees, but only Union Oil Co. posts below 24 degrees.
Column 3—Whittier and La Habra crudes, 14 to 22 degrees; Montebello, 14 to 30 degrees.
Column 4—Kern River, Newhall and McKittrick, 14 to 19 degrees; Midway-Sunset and Elk Hills, 14 to 33 degrees; Lost Hills and Belridge, 14 to 34 degrees.
Column 6—Santa Fe Springs. Only Union Oil Co. posts below 24 degrees.
Column 9—Salt Lake, 14 to 19 degrees, inclusive; Santa Maria, 14 to 30 degrees; Ventura, 14 to 35 degrees. Posted only by Union Oil Co.

NEBRASKA

Standard Oil Co. (Nebraska)

	Gasoline			Kero.
	Tank wagon	Service station	Inclds tax of	Tank wagon
Omaha	20.25	22.25	2.0	14.5
McCook	21.75	23.75	2.0	16.0
Norfolk	20.75	22.75	2.0	15.0
North Platte ..	21.75	23.75	2.0	15.75
Scottsbluff . .	21.25	23.25	2.0	15.25

PACIFIC COAST DISTRICT

Standard Oil Co. (California)

	Gasoline			Kero.
	Tank wagon	Service station	Inclds tax of	Tank wagon
San Francisco .	18.0	22.0	2.0	15.5
Los Angeles ...	16.5	20.5	2.0	16.5
Fresno	18.5	22.5	2.0	17.5
Reno, Nev.	23.5	27.5	4.0	19.0
Portland, Ore. .	19.0	23.0	3.0	16.5
Seattle, Wash. .	18.0	22.0	3.0	16.5
Spokane	22.0	26.0	3.0	20.5
Tacoma	18.0	22.0	3.0	16.5
Phoenix, Ariz. .	25.0	28.0	3.0	21.5

TANK WAGON CHANGES

April 26—Magnolia Petroleum Co. advanced kerosene 1 cent at Oklahoma City and Tulsa and 3 cents at Muskogee.

April 28—Continental Oil Co. advanced kerosene ½ cent in Wyoming, Montana and New Mexico. Magnolia Petroleum Co. advanced tank wagon and service station prices of gasoline 2 cents at San Antonio. The same company advanced kerosene 2 cents at Dallas, Fort Worth and San Antonio and 1 cent at Houston and El Paso.

April 29—Standard Oil Co. of Indiana advanced tank wagon and service station prices of gasoline 1 cent except at a few points, where prices were raised 2 cents. The same company advanced tank wagon and service station prices of gasoline 1 cent generally and in Omaha and Lincoln and a few other points where cut-rate prices have existed, postings were restored to normalcy. Only four points in Nebraska now are below normal. The same company advanced kerosene ½ cent.

April 30—Standard Oil Co. of New Jersey advanced gasoline 1½ cents in North and South Carolina and 1 cent in the remainder of its territory. Kerosene was advanced ½ cent. Standard Oil Co. of Louisiana advanced gasoline 1½ cents generally. Magnolia Petroleum Co. advanced gasoline 1½ cents in Arkansas but only ½ cent in Texarkana. It advanced kerosene ½ cent in Arkansas.

May 1—Standard Oil Co. of New York advanced gasoline and kerosene 1 cent. Continental Oil Co. advanced gasoline and kerosene 1 cent in Colorado, Wyoming, Utah, Nevada and Idaho. In the latter State the increase was not general but included Boise in the accompanying table.

May 3—Atlantic Refining Co. advanced gasoline 1 cent.

CRUDE PRICE CHANGES

April 28—Humble Oil & Refining Co. advanced all gravities of Grade B Gulf Coast crude 5 cents and added five new gravities with a differential of 5 cents. Grade B crude now has 12 grades ranging from 25 gravity to 35 gravity and above. Advance met by The Texas Company and the Gulf Pipe Line Co.

April 30—The Sun Pipe Line Co. met the Humble Oil & Refining Co. advances and changes in Grade B Gulf Coast crude posted April 28 and advanced High Island crude 15 cents.

APPEAL BY ATLANTIC IN SUPERIOR OIL SUIT

PHILADELPHIA, Pa., May 1. — An appeal from a decision of Judge Hugh M. Morris of the District Court of Delaware, awarding $3,279,081 damages to minority stockholders of Superior Oil Corp. against Atlantic Refining Co. and rescinding a 10-year contract for the complete output of its oil, was made to the United States Circuit Court of Appeals by Charles Evans Hughes, counsel for the Atlantic Refining.

In his decision Judge Morris held that the transaction was in fraud on the Superior stockholders, but Mr. Hughes in his argument to Judges Buffington, Woolley and Davis maintained there was no fraud whatever and that neither the majority stockholders, the bankers nor the public were complaining.

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Oil Securities Were Freely Sold

Decline in Face of Encouraging News Had a Precedent in 1920, Record Oil Year. Atlantic Refining at New High

By N. O. Fanning

New York Bureau, The Oil and Gas Journal, 30 Church St., New York

NEW YORK, May 3.—Oil securities were freely sold during the past week despite several encouraging developments including the declaration of an extra dividend by the Standard Oil Co. of Indiana, and the resumption of dividend by Prairie Oil & Gas Co. The course of oils in declining in the face of good news had precedent in 1920, a record oil year, when oil securities followed a consistently downward course.

One or more oil mergers are believed to be pending, involving both independent and Standard Oil Companies. Four companies mentioned are Skelly Oil, Atlantic Refining, California Petroleum and Phillips Petroleum.

Atlantic Refining

Atlantic Refining stock reached a new high for the year 116½, during the week. This was due largely to the company's strong earnings and financial position. It is believed the company will retire part of its funded debt and resume dividends on the common stock in the near future. The rate talked of is $4 annually, which would be conservative.

Atlantic Refining Co.'s name is also connected with mergers reported, due to the fact that it is one of the prominent Standard Oil Companies that has not figured in a combination recently, and which woud apparently be benefited by a strengthening of its position as to oil production, especially since some of its leading competitors have acquired large production through consolidations.

Atlantic Refining Co. has in recent years been a consistent buyer of California crude and refined oil, and therefore it is believed purchase of California producing properties would merely constitute a further step of more permanent sort in the same direction. The two properties on the Pacific Coast which would fit in to such a merger are California Petroleum or Union Oil Co. of California.

Usual Pure Oil Extra

The Pure Oil Co. has declared an extra dividend of 12½ cents a share and regular quarterly dividend of 37½ cents a share on the common stock, both payable June 1 to stockholders of record May 10. This is the same amount as in the preceding quarter.

American Republics

The report of the American Republics Corp. and subsidiaries for the quarter ended March 31, 1926, shows net income of $423,663 after interest, charges and Federal taxes, equivalant after preferred dividends to $1.24 a share earned on 200,000 no par value shares of common stock. This compares with $478,243, or $1.51 a share, in the preceding quarter, and $651,458, or $2.38 a share, in the first quarter of 1925.

The consolidated income account for the quarter ended March 31, 1926, compares as follows:

	1926	1925
Sales	$5,915,308	$7,264,217
Cost of sales	4,856,582	5,952,418
Expenses	475,205	527,097
Net profits	$ 583,521	$ 784,702
Sur. after taxes	423,663	651,458

Lion Oil Earnings

The Lion Oil Refining Co. reports for the year ended December 31, 1925, net income of $1,287,012 after interest, depreciation, depletion, Federal taxes, etc., equivalent to $6.42 a share earned on 200,000 no par shares of stock. This compares with $258,569, or $1.29 a share, in 1924.

The income account for the year ended December 31, 1925, compares as follows:

	1925	1924
Sales	$7,479,597	$5,014,752
Costs and expenses	4,962,198	3,889,314
Operating profit	$2,517,399	$1,125,438
Other income	68,220	39,869
Total income	$2,585,619	$1,165,307
Interest	131,349	198,979
Depr., depletion, etc.	1,036,070	676,320
Federal taxes	131,188	31,439
Net income	$1,287,012	$ 258,569

The balance sheet of the Lion Oil Refining Co. as of December 31, 1925, follows:

Assets: Cash, $197,305; accounts and notes receivable, $403,282; inventories, $1,221,153; prepaid expenses, $78,356; property and equipment, $3,555,539; plant, pipe line, tank cars, etc., $3,639,832; total, $9,095,467.

Liabilities: Notes payable, $415,530; accounts payable, $300,793; reserves and accruals, $265,758; tank car trust notes, $29,700; first mortgage gold bonds, $750,000; deferred liabilities, $40,371; depreciation and depletion reserve, $2,058,982; capital stock and surplus (represented by 200,000 shares of no par value stock), $5,234,333; total, $9,095,467.

E. C. Winters, president of Lion Oil Refining Co., states that the substantial increase in earnings in 1925 reflects the company's large gain in crude oil production as a result of the development of deeper sands in the Smackover Field, more efficient operation of the El Dorado refinery and better prices obtained for crude and refined products.

Louisiana Oil Refining

The consolidated statement of the Louisiana Oil Refining Co. for the quarter ended March 31, 1926, shows net income after interest, depreciation, depletion, amortization, etc., of $262,484, including realized appreciation of $209,399. This is equivalent after allowing for 6½ per cent preferred dividend requirements to 20 cents a share earned on the outstanding 1,140,063 shares of no par value common stock.

The consolidated income account for the quarter ended March 31, 1926, follows:

Earnings	$563,716
Deductions	42,191
Interest	70,316
Depr., depl., etc.	398,119
Balance	$ 53,085
Realized appreciation	209,399
Net income	$262,484

Standard of New Jersey

Net earnings of the Standard Oil Co. of New Jersey for 1925 are estimated by the Wall Street Journal at from $100,000,000 to $120,000,000, or from $5 to $6 a share on the common stock. These are the highest estimates yet made, previous ones having been in the neighborhood of $75,000,000 to $85,000,000.

Texas Pacific Coal & Oil

The Texas Pacific Coal & Oil Co. reports for the quarter ended March 31, 1926, net income of $774,522, after expenses and charges, but before depreciation and depletion, against $493,126 in the first quarter of 1925.

The income account for the quarter ended March 31, 1926, compares as follows:

	1926	1925
Gross	$1,729,757	$1,313,799
Expenses	1,029,680	823,448
Operating profit	$ 700,077	$ 490,351
Other income	120,790	44,190
Total income	$ 820,867	$ 534,541
Deductions	46,345	41,415
*Net income	$ 774,522	$ 493,126

*Before depreciation and depletion.

Prairie Oil & Gas Dividend

The Prairie Oil & Gas Co. Saturday declared the regularly quarterly dividend of 50 cents per share payable on May 31 on stock of record on May 15.

Indiana Dividend

Directors of the Standard Oil Co. of Indiana declared a cash dividend of 62½ cents and an extra cash dividend of 25 cents on each share of capital stock. The payment is June 1 and will go to all stockholders on record May 17.

Amerada Petroleum Corp.

Net income of $811,628 for the first quarter of 1926, after setting aside $618,675 for depreciation, depletion and Federal taxes and after payment of all expenses, is reported by the Amerada Corporation. This was equivalent to $1.14 a share earned on the company's 713,300 outstanding shares of common capital stock, for the quarter, or at an annual rate of over $4.56 a share. The report shows that the company has no funded debt and no preferred stock. Its common shares, formerly of $10 par value, are now of no par value.

According to President E. L. DeGolyer, conditions in the oil industry today are sounder than at any previous time in six years. Speaking of his own company he said, "Prospects for the second quarter are for much higher earnings than in the first quarter."

The consolidated statement for the first quarter of Amerada Corporation and its subsidiaries follows:

Gross oper. inc.	$2,305,761.43
Operating costs, etc.	916,456.52
Operating income	$1,389,304.91
Other income	40,997.28
Total income	$1,430,302.19
Deprec., depl., Federal taxes	618,674.66
Net income	$ 811,627.53

CONNORS SUCCEEDS JAMES

Eugene F. Connors, formerly vice president of the Pittsburgh Oil & Gas Co. of Pittsburgh, Pa., is the new vice president of the Independent Oil & Gas Co. of Tulsa, Okla., succeeding Wade H. James, resigned.

NEW YORK STOCK EXCHANGE—LIST OF ACTIVE STOCKS

Stocks—	Par	Clos. Quot. May 3	Clos. Quot. Apr. 26	1926 High	1926 Low	1925 High	1925 Low	1924 High	1924 Low
American Republics	..	*63	*64	74	63	79¾	48	48	25
Associated Oil	25	*52½	53	59½	44¾	47¼	32	35⅝	27⅝
Atlantic Ref., com.	100	113½	109¾	116½	97	117½	95¼	140½	78½
Barnsdall "A"	25	25¼	27	33½	26	33½	18¾	29½	14
California Pet., com.	25	32¾	33½	38¼	30⅝	34⅝	23⅞	29	19⅞
General Petroleum	25	59¼	60⅝	65⅝	51¼	59	42	45	33⅝
Houston Oil	100	58⅛	59	72	50¼	85	59	82½	61
Independent Oil & Gas	..	24	25⅝	34	20¼	41¾	13½	16¼	5⅝
Indian Refining	10	10½	10⅝	13⅜	9½	14¼	5½	7	3⅝
Louisiana Oil	10	14	14½	19⅝	12	23⅝	13⅜	..	..
Maracaibo	..	22¼	23	28⅞	20⅝	35½	20⅝	37¼	25⅝
Marland	..	54	55	60¼	49¼	60¾	32⅝	42	29
Mexican Seaboard	..	8⅝	8¼	12⅛	6	22½	9	25⅝	14⅛
Mid-Continent Pet.	..	30½	32	41	28⅝	38	25⅝	40¼	22⅝
National Supply	50	61¼	63	65⅞	55⅞	71	54⅝	72½	54
Oil Well Supply	25	30½	30¼	36	30½	38	33⅝	..	..
Pacific Oil	..	55⅝	56¼	83¼	52⅝	78¼	51¼	58¼	46
Pan. Amer. P. & T., com.	50	64	65⅝	76⅝	56¼	83⅞	59¼	65	44½
Pan. Amer. Western B.	..	37⅝	38¾	46	34	49⅝	37¼	..	..
Phillips Pet.	..	44⅛	44⅝	45½	42½	47⅞	36½	42¼	28½
Producers & Refiners	50	12⅝	13	17½	11	32⅝	12½	43½	29⅜
Pure Oil, com.	..	26½	27⅝	31	26	33⅜	25½	30½	20
Royal Dutch, N. Y., sh.	13.40	61⅛	52	57⅝	50	57⅝	48¼	59½	40⅝
Shell Transport	10	*42	42⅞	48⅞	42	49	39⅝	42	33
Shell Union, com.	..	24⅝	25⅝	28½	24	28⅝	21⅝	22½	15⅝
Simms Pet.	10	20¼	21½	28⅝	20⅝	28½	17⅜	24	10⅝
Sinclair Consolidated, com.	..	21½	21⅝	24⅝	19⅝	24⅞	17	17½	15
Skelly Oil	25	34⅝	33¼	34⅜	27	33½	21⅜	29	17⅛
Standard of California	25	55	55⅞	62¼	54	67⅛	51⅜	68½	55½
Standard of New Jersey, com.	25	44	44	46⅝	40¼	47⅛	38⅝	41½	33
Sun Oil Co.	..	33	33	41⅝	31½	43⅞	38½	..	..
The Texas Company	25	50¼	51½	54⅞	49	55	42⅜	45⅝	37⅜
Texas Pacific Coal & Oil	10	14	14⅝	19½	12⅜	23⅝	11	15¼	8¼
Tide Water Oil (new)	..	*31	31½	39¼	30¼	‡152	122	151	116¼
Transcontinental	..	3⅝	3½	4⅜	2	5⅞	3¼	6¼	3⅝
Union Oil of California	25	42⅜	43	49⅞	37¼	43⅝	33⅜	39	35½
Union Tank, com.	100	90	90	94	84¼	‡134	118	132⅞	94
White Eagle Oil & Refining	..	26½	26⅝	29⅝	26¼	31⅜	26⅝	29⅝	23½
Standard Oils									
Anglo-American Oil	£1	17¼	*17	19⅜	17⅜	26¾	17⅛	18⅜	14⅝
Borne Scrymser	100	*330	335	248	226	240	205	164	150
Buckeye Pipe Line	50	53½	*52½	59½	54½	72	53½	55½	51
Chesebrough Mfg. Co.	25	67	*66¾	72⅜	63	74	48¼	52⅜	39¼
Continental	10	21¼	20⅞	25⅝	20½	31½	21⅞	..	..
Crescent Pipe Line	25	*21⅝	*13⅜	16	14⅜	17½	10	20	11⅜
Cumberland Pipe Line	100	114	119½	137	119½	156	128	148	108
Eureka Pipe Line	100	49	50	63⅜	50	96	61¼	105	74
Galena Signal, com.	100	*20⅜	*20⅜	32½	24	68½	23⅜	69⅜	62½
Humble Oil & Refining Co.	25	64½	63⅞	99⅝	56	99	42½	43⅜	36
Illinois Pipe Line	100	143½	*142	144	134½	154½	124	161	123
Imperial Oil (Ltd)	..	34½	34	38⅜	32½	39¼	27¼	119	99
Indiana Pipe Line	50	*63½	*63⅜	67	58	84	57⅜	100	66
International Pet. Co.	10	32¼	32¾	35¼	28⅜	35⅜	22⅛	24⅜	16⅞
National Transit Co.	12.50	16	16½	20⅜	18	25½	16⅛	25⅞	20⅝
New York Transit	100	*45	*45	50	39	79	50	97	54½
Northern Pipe Line	100	*72	*72	80½	70⅝	88	67⅛	107½	72
Ohio Oil Co.	25	59	60⅝	67⅝	59⅝	75¼	60	79½	53
Penn.-Mex. Fuel	25	*19	19⅝	23	16¼	44	19	35⅝	27
Prairie Oil & Gas	25	5⅝	53⅜	60¾	52¼	65⅛	45⅞	269	193
Prairie Pipe Line	100	123¾	124	127	122½	129¾	105	111	100
Solar Refining Co.	100	*198	*198	212	191	259	200	240	170
South Penn Oil	25	38½	*39¼	50	40	‡197	139	176	117
Southwest Pa. Pipe Line	100	53	51⅝	54½	47½	64	50	89	68
Southern Pipe Line	100	*65½	*65½	74½	61¾	103	63	100	80½
Standard of Indiana	10	63⅞	63	70¼	61⅝	70⅝	59½	69⅝	54¼
Standard of Kansas	25	27½	27½	36½	25	46	30¼	50½	32½
Standard of Kentucky	25	118	118	134⅝	108	137	114⅝	121⅞	101
Standard of Nebraska	100	264	258	263	206	270	231	262	198
Standard of New York	25	30⅞	31¼	47¼	31⅝	48⅝	40	48	37⅝
Standard of Ohio, com.	100	*315	*315	362	310	369	338	337½	277
Swan & Finch, com.	25	*17	*17	21	18	27	12	28	20
Vacuum Oil	25	98	99½	109⅝	94½	109½	80½	83½	50½
Miscellaneous									
Gulf Oil Corp. of Pa.	25	*85	*85	93¾	82½	98¼	63⅜	67⅝	56

*Bit. no sales. ‡Old stocks.

The Oil and Gas Journal's weekly average price of 20 representative petroleum stocks listed on the New York Stock Exchange was as follows:

May 3	57.23	Mar. 29	56.18	Feb. 20	58.23
Apr. 26	57.39	Mar. 22	57.96	Feb. 15	57.51
Apr. 19	55.63	Mar. 15	56.34	Feb. 8	58.96
Apr. 12	56.07	Mar. 8	55.02	Feb. 1	58.51
Apr. 5	56.78	Mar. 1	55.84	Jan. 25	57.96

GREAT ACTIVITY IN FIELDS SHOWN BY APRIL SUMMARY

(Continued from Page 36)

Carter	15	50	65
Miscellaneous	17	61	78
Total April	299	1,102	1,401
Total March	226	1,020	1,246
Difference	73	82	155

KANSAS FIELDS

County—	Comp.	Prod.	Dry	Gas
Anderson	30	1,620	7	3
Butler	35	4,670	11	0
Chautauqua and Elk	18	265	6	3
Cowley	20	846	9	2
Greenwood	59	8,765	12	0
Lyon	9	2,380	2	0
Russell	7	1,230	0	0
Miscellaneous	23	555	14	4
Total April	201	20,330	62	12
Total March	211	17,310	74	6
Difference	10	3,020	12	6

Summary of Rigs and Wells Drilling

County—	Rigs	Drg.	Ttl.
Butler	10	48	58
Chautauqua and Elk	4	17	21
Cowley	7	35	42
Greenwood	44	82	126
Kingman	2	9	11
Lyon	15	27	42
Montgomery	0	13	13
Rice	1	11	12
Russell	0	12	12
Sumner	2	11	13
Miscellaneous	18	91	109
Total April	103	356	459
Total March	103	360	463
Difference	0	4	4

EAST CENTRAL TEXAS

Summary of Field Operations

County—	Comp.	Prod.	Dry	Gas	Rigs	Drg.	Ttl.
Anderson	3	0	2	0	0	1	1
Henderson	1	0	1	0	0	3	3
Navarro	1	0	1	0	0	5	5
Limestone	2	50	1	0	2	9	11
Cherokee	2	0	1	0	0	2	2
Hunt	1	0	1	0	0	2	2
Ellis	1	0	1	0	0	1	1
Freestone	0	0	0	0	1	2	3
Miscellaneous	0	0	0	0	0	6	6
Total Apr.	9	50	8	0	3	21	34
Total Mar.	6	10	5	0	5	27	32
Difference	3	40	3	0	2	4	2

NORTH CENTRAL TEXAS

County—	Comp.	Prod.	Dry	Gas
Wichita	46	760	22	0
Wilbarger	32	1,695	9	0
Archer	119	6,140	46	0
Young	26	795	10	0
Hutchinson	11	4,605	0	1
Stephens	4	20	0	2
Eastland	13	100	5	2
Brown	56	7,432	19	1
Reagan	4	5,376	0	0
Coleman	12	1,005	5	2
Mitchell	5	535	0	0
Montague	14	963	1	1
Shackelford	11	1,101	6	1
Palo Pinto	3	200	2	0
Loving	1	0	1	0
Clay	4	45	3	0
Baylor	2	10	1	0
Gray	1	380	0	0
Callahan	3	15	2	0
Cooke	1	0	1	0
Jack	1	50	0	0
Scurry	1	10	0	0
Upton	5	195	2	0
Crockett	2	1	1	0
Foard	1	0	1	0
Throckmorton	2	432	0	0
Tom Greene	1	0	1	0
Crane	1	90	0	0
Potter	1	0	0	1
Carson	2	1,000	0	1
Howard	1	225	0	0
Sterling	1	0	1	0
Total April	387	33,287	139	12
Total March	500	35,483	201	11
Difference	113	2,196	62	1

Summary of Rigs and Wells Drilling

County—	Rigs	Drg.	Ttl.
Wichita	2	52	54
Wilbarger	10	87	97
Archer	21	75	96
Young	3	22	25
Stephens	11	45	56
Eastland	11	19	30
Brown	17	86	103
Coleman	7	38	45
Callahan	4	18	22
Mitchell	4	14	18
Hutchinson	36	118	154
Shackelford	6	33	39
Reagan	4	33	37
Miscellaneous	32	219	251
Total April	168	859	1,027
Total March	58	423	481
Difference	110	436	546

ARKANSAS

Summary of Field Operations

County—	Comp.	Prod.	Dry	Gas	Rigs	Drg.	Ttl.
Union	98	13,659	17	4	28	91	119
Ouachita	26	1,828	3	2	2	18	20
Nevada	11	1,575	3	0	2	6	8
Columbia	1	10	0	0	3	4	7
Ark. wildcats	5	20	4	0	1	9	10
Total Apr.	141	17,092	27	6	36	128	164
Total Mar.	77	6,047	22	8	22	100	122
Difference	64	11,045	5	2	14	28	42

NORTH LOUISIANA

Summary of Field Operations

Parish—	Comp.	Prod.	Dry	Gas	Rigs	Drg.	Ttl.
Bossier	7	40	3	1	2	5	7
Caddo	23	338	2	4	8	33	41
La. Salle	63	9,880	5	0	27	49	76
Monroe district	4	0	0	4	4	11	15
Webster	6	345	1	1	9	11	20
La. wildcats	0	18	6	0	4	13	17
De Soto	0	0	0	0	4	5	9
Total Apr.	103	10,621	17	10	58	127	185
Total Mar.	90	7,594	19	6	16	99	115
Difference	13	3,027	2	4	42	28	70

GULF COAST

Summary of Field Operations

District—	Comp.	Prod.	Dry	Gas	Rigs	Drg.	Ttl.
Boling	7	14,750	2	0	14	24	38
Batson	3	120	1	0	2	3	5
Blue Ridge	2	900	0	0	2	2	4
Barber Hill	0	0	0	0	1	1	2
Big Creek	0	0	0	0	0	3	3
Dayton	0	0	0	0	0	2	2
Damon Mound	0	0	0	0	0	1	1
Edgerly (La.)	3	430	0	0	1	2	3
Goose Creek	7	620	1	0	2	11	13
Humble	4	1,650	1	0	2	5	7
Hull	10	7,675	1	0	7	15	22
High Island	2	50	1	0	1	4	5
Jennings (La.)	3	450	1	0	1	2	4
Markham	0	0	0	0	0	3	3
Lockport (La.)	2	4,700	0	0	2	6	8
Nash	0	0	0	0	0	6	6
Orchard	0	0	0	0	0	1	1
Orange	9	5,875	3	0	3	15	18
Pierce Jct.	2	1,750	0	0	1	2	3
Piedras Pintas	2	0	2	0	0	4	4
Spindletop	4	8,125	1	0	3	5	8
Saratoga	1	5	0	0	0	3	3
Sour Lake	7	95	1	0	3	5	8
South Liberty	2	30	1	0	1	2	3
Vinton (La.)	5	550	1	0	0	8	8
W. Columbia	2	25	1	0	0	1	1
Miscellaneous	10	500	8	0	19	40	59
Total Apr.	87	48,310	26	0	66	176	242
Total Mar.	96	27,047	39	0	49	145	194
Difference	9	21,263	13	0	17	31	48

SOUTHWEST TEXAS

Summary of Field Operations

Field—	Comp.	Prod.	Dry	Gas	Rigs	Drg.	Ttl.
Luling	1	300	0	0	0	3	3
Mirando	26	3,000	3	12	7	18	25
Somerset	3	28	0	0	1	3	4
Rockdale-Minerva	3	75	0	0	4	9	13
Miscellaneous	3	75	0	0	4	9	13
Total Apr.	34	3,518	11	14	31	92	123
Total Mar.	52	8,142	7	16	24	72	96
Difference	18	4,624	4	2	7	20	27

WYOMING

Summary of Field Operations

District—	Comp.	Prod.	Dry	Gas	Rigs	Drg.	Ttl.
Big Muddy	0	0	0	0	0	1	1
Salt Creek	24	11,529	0	0	18	50	68
Lance Creek	1	450	0	0	0	1	1
Big Horn Basin	3	50	1	0	3	57	60
Lost Soldier, Carbon Co.	7	200	3	3	2	34	36
Rock River district	0	0	0	0	0	16	16
Fremont Co.	1	0	1	0	1	35	36
Osage	0	0	0	0	5	11	16
Natrona Co.	1	0	0	1	0	7	7
Lincoln and Uintah Cos.	0	0	0	0	2	27	29
Baxter Basin	0	0	0	0	0	7	7
Miscellaneous	0	0	0	0	1	32	33
Total Apr.	37	12,229	5	4	32	278	310
Total Mar.	43	17,008	3	1	35	268	303
Difference	6	4,779	2	3	3	10	7

MONTANA

Summary of Field Operations

District—	Comp.	Prod.	Dry	Gas	Rigs	Drg.	Ttl.
Sunburst	28	4,529	5	3	8	47	55
Cat Creek and Miscellaneous	2	75	1	0	7	82	89
Total Apr.	30	4,604	6	3	15	129	144
Total Mar.	13	4,077	5	2	17	140	157
Difference	17	527	1	1	2	11	13

COLORADO

Summary of Field Operations

District—	Comp.	Prod.	Dry	Gas	Rigs	Drg.	Ttl.
Total April	10	0	10	0	19	103	122
Total March	5	430	2	0	18	107	125
Difference	5	430	8	0	1	4	3

UTAH

Summary of Field Operations

District—	Comp.	Prod.	Dry	Gas	Rigs	Drg.	Ttl.
Total April	0	0	0	0	3	31	34
Total March	0	0	0	0	2	32	34
Difference	0	0	0	0	1	1	0

NEW MEXICO

Summary of Field Operations

District—	Comp.	Prod.	Dry	Gas	Rigs	Drg.	Ttl.
Total April	27	1,395	9	0	15	137	152
Total March	22	910	8	0	11	138	149
Difference	5	485	1	0	4	1	3

EASTERN FIELDS

Summary of Wells Completed

Field—	Comp.	Prod.	Dry	Gas
Allegany	19	25	2	0
Bradford	86	227	1	1
Middle Field	3	4	0	0
Venango-Clarion	23	24	3	2
Butler-Armstrong	15	43	5	3
Southwest Pennsylvania	20	62	3	12
West Virginia	93	632	16	36
Southeast Ohio	62	664	15	7
Total April	321	1,681	45	61
Total March	289	2,425	36	67
Difference	32	744	9	6

Summary of Work Under Way

Field—	Rigs	Drg.	Ttl.
Allegany	13	11	24
Bradford	26	92	118
Middle Field	1	6	7
Venango-Clarion	5	18	23
Butler-Armstrong	5	14	19
Southwest Pennsylvania	9	23	32
West Virginia	47	127	174
Southeast Ohio	30	76	106
Total April 30	136	367	503
Total March 31	144	342	486
Difference	8	25	17

CENTRAL OHIO

Summary of Field Operations

	Comp.	Prod.	Dry	Gas	Rigs	Drg.	Ttl.
Knox	0	0	0	0	1	2	3
Ashland	4	0	0	4	4	4	8
Medina	1	1	0	0	3	2	5
Lorain	6	0	3	3	1	2	3
Wayne	5	25	2	2	4	4	8
Holmes	7	140	1	1	3	15	18
Athens	2	0	0	2	2	6	8
Coshocton	3	15	0	2	2	3	5
Cuyahoga	2	0	0	2	1	3	4
Guernsey	2	0	0	2	8	6	14
Total April	32	181	6	18	29	47	76
Total Mar.	35	514	11	18	19	58	77
Difference	3	333	5	0	10	11	1

LIMA FIELD

Summary of Field Operations

	Comp.	Prod.	Dry	Gas	Rigs	Drg.	Ttl.
Wood	8	89	1	0	1	9	10
Hancock	4	61	0	0	1	6	7
Allen	2	52	0	0	1	3	4
Auglaize	3	65	0	0	0	6	6
Sandusky	6	43	0	1	1	1	2
Mercer	2	16	0	0	0	1	1
Van Wert	1	4	0	0	0	0	0
Seneca	0	0	0	0	0	2	2
Lucas	0	0	0	0	0	2	2
Ottawa	4	58	0	0	1	2	3
Shelby	6	50	0	0	3	5	7
Hardin	0	0	0	0	0	7	7
Darke	0	0	0	0	0	1	1
Paulding	0	0	0	0	2	0	2
Logan	0	0	0	0	0	1	1
Clark	0	0	0	0	0	1	1
Michigan	3	47	0	0	0	7	7
Total Apr.	39	485	1	1	9	54	63
Total Mar.	30	495	1	2	15	49	64
Difference	9	10	0	1	6	5	1

ILLINOIS

Summary of Field Operations

	Comp.	Prod.	Dry	Rigs	Drg.	Ttl.
Clark	3	12	0	0	3	3
Crawford	5	66	1	2	6	8
Lawrence	0	0	0	0	5	5
Wabash	12	197	6	4	18	22
Marion	1	0	1	0	1	1
Coles	0	0	0	0	1	1
Douglass	0	0	0	0	1	1
Jasper	1	5	0	0	1	1
White	0	0	0	1	0	1
Morgan	2	0	2	0	1	1
Fayette	0	0	0	0	1	1
Edwards	0	0	0	0	1	1
Randolph	1	1	0	0	1	1
Montgomery	1	0	1	0	0	0
Madison	0	0	0	0	1	1
McDonough	1	0	1	0	1	1
Total April	27	281	12	9	41	50
Total March	18	492	5	7	41	48
Difference	9	211	7	2	0	2

INDIANA

Summary of Field Operations

	Comp.	Prod.	Dry	Rigs	Drg.	Ttl.
Wells	0	0	0	0	1	1
Jay	0	0	0	1	3	4
Adams	1	3	0	0	4	4
Delaware	1	0	1	0	0	0
Randolph	0	0	0	1	0	1
Gibson	0	0	0	0	3	3
Pike	3	43	1	1	5	6
Sullivan	0	0	0	0	1	1
Knox	1	0	1	0	6	6
Allen	0	0	0	0	2	2
Daviess	0	0	0	0	3	3
Henderson	0	0	0	0	1	1
Jackson	0	0	0	0	1	1
Shelby	0	0	0	0	1	1
Lagrange	0	0	0	0	1	1
Vigo	0	0	0	0	1	1
Dubois	0	0	0	0	1	1
Warrick	0	0	0	0	1	1
Total April	6	46	3	3	35	38
Total March	5	28	3	4	32	36
Difference	1	18	0	1	3	2

KENTUCKY-TENNESSEE

Summary of Field Operations

	Comp.	Prod.	Dry	Gas	Rigs	Drg.	Ttl.
Warren	11	22	3	0	1	13	14
Allen	11	21	3	0	0	9	9
Barren	26	122	9	1	0	29	29
Owensboro district	14	184	4	0	3	19	22
Cumberland-Monroe	9	460	2	0	0	26	26
Adair	0	0	0	0	2	1	3
Hopkins	0	0	0	0	0	1	1
Simpson	0	0	0	0	0	5	5
Green	0	0	0	0	0	3	3
Casey	0	0	0	0	0	2	2
Wayne	2	2	2	0	1	7	8
Lee-Owsley	1	10	0	0	0	9	9
Lawrence-Johnson	8	65	0	0	3	10	13
Johnson-Magoffin	3	21	0	0	3	8	11
Floyd	1	0	0	1	0	6	6
Knox	0	0	0	0	0	2	2
Estill	4	20	0	0	0	3	3
Wolfe	1	10	0	0	0	0	0
Morgan	1	2	0	0	0	5	5
Elliott	0	0	0	0	1	2	3
Menifee	0	0	0	0	0	2	2
Laurel	0	0	0	0	0	1	1
Jackson	0	0	0	0	0	1	1
Greenup	0	0	0	0	0	1	1
Kentucky	92	939	23	2	14	164	178
Tennessee	8	835	1	0	0	12	12
Mississippi	0	0	0	0	3	8	11
Alabama	0	0	0	0	0	5	5
Georgia	0	0	0	0	1	3	4
Total April	100	1,774	24	2	18	192	210
Total March	61	580	18	0	15	173	188
Difference	39	1,194	6	2	3	19	22

Late Fields

(Continued from Page 38)

The Rycade Petroleum Corp. set 6⅝-inch casing in No. 7 Nash, Nash Dome, on the line of Fort Bend and Brazoria Counties, at 4,344 feet. The bit went into 16 feet of sand, which will be tested. No. 2 Flessner is estimated good for 25,000,000 feet of gas. No. 7 Nash offsets No. 5 Nash, the discovery well there.

James Weed's No. 5 Fletz on the Boling Dome is making 200 bbls. and salt water at 435 feet. It is northeast of the deeper sands there. Several small cap rock wells have been completed on the dome before the deep drilling campaign started on the northwest side.

According to the annual report of the oil and gas division of the State Railroad Commission, there was a total of 20,000 producing wells in Texas at the close of 1925. Wells drilled during last year numbered 9,733. The report shows more than 10,000 miles of pipe lines under the jurisdiction of the commission.

PENNSYLVANIA MARKET RESPONDS TO DEMAND

OIL CITY, Pa., May 1.—Developments in the marketing end of the business, especially the tank wagon increases made by the Standard Oil Co. of Indiana, strengthened the refined market in the Pennsylvania territory during the past week.

The demand at the refineries for gasoline was better than it was in the previous week and prices were holding steady. It seemed to be responding to the more favorable conditions and to increased consumption which came as a result of slightly better weather conditions. Good weather has been slow in coming throughout the East and it is still too cool for much pleasure use of motor vehicles. Naphtha demand was also improved.

Kerosene continues to be probably the brightest spot in the market. It was very strong during the week, with prices considerably higher and none of the product available for prompt shipment in this territory.

Fuel oil was pretty strong and in fairly good demand for this product. Cylinder stocks were weak with no demand at all. Neutrals remained in about the same position as during the previous week. Wax was weak with very little demand.

SHREVEPORT MARKET HAS A FIRMER TONE

SHREVEPORT, La., May 1.—The 1½-cent increase in tank wagon gasoline along with the seasonal increase in consumption of refined products, brought about a firmer tone for almost all refined products during the week. The result was refiners looked forward to a continued strong market that is expected to show a steady increase.

Kerosene continued to be the star product commanding a price of 8½ to 8⅝ cents and scarce at that price. Hardly any is available and refiners are taking care of direct trade. Several refiners reported their output oversold.

Gasoline was firm. U. S. Motor was strong to 11¼ to 11⅝ cents, but inquiries were light; 64-66, 375, barely held its own at 12¾ to 13 cents. Naturals increased slightly. Grade C advanced to 9 and 9¼ cents f.o.b. Monroe, but was not following U. S. Motor as was expected.

Fuel oil maintained a firm position and continues on a gradual upward trend. Louisiana 18-20 was commanding a price of $1.22½ to $1.25, and strong at that price. Arkansas refinery oil was strong at $1.20. The gas oil market was the weakest of the products quoted. It was sluggish at 4⅛ to 4¼ cents.

LONE STAR GAS ORDERS PIPE

PITTSBURGH, Pa., May 1. — Lone Star Gas Co. has ordered 100 miles of 12¾-inch line pipe.

SOUTHWEST TEXAS

(Continued from Page 52)

the Georgetown, the well is looking extremely good as this is written for production in the Edwards lime. Marland Oil Co.'s No. 1 Mihalski in eastern Bexar County, is drilling below 1,000 feet. It was showing a little gas late in the week. Preparatory to making the location for this well, Marland drilled a large number of diamond core holes, making as careful preliminary preparations as has been made for any test in southwest Texas. The Humble Oil & Refining Co.'s No. 1 Stopper, a few miles north of the Marland test, topped the Edwards lime at 986 feet and was drilling in the Edwards late in the week with no encouraging showings.

Bee County

Benedum & Trees' No. 1 Goree, in the northwest corner of Bee County, was spudded in late last week. It is their eighth test to get started in south Texas. W. E. Clark is arranging to drill a new well on the Welder farm east of Beeville. The first test cannot be completed but is not being abandoned at this time. It is shut down and the rig will be moved to the new location. W. G. Clark, on the Scott farm north of Beeville, has spudded in and made several hundred feet of hole.

Brooks County

Benedum & Trees (Pittsburgh Oil Development Co.) cored a dry sand at 1,300 feet in No. 1 Wormser in Brooks County, and has resumed drilling.

Brewster County

Green Valley Oil Corp.'s No. 2 Wilson in Brewster County, drilling on Survey 5, B 212 T. & S. L., the location being 40 feet from No. 1 Wilson, is below 1,000 feet and nearly down to the 1,740-foot level where No. 1 Wilson got production a few years ago. No. 1 bailed out several hundred barrels into steel storage before it was lost and resisted all efforts at completing it. Two other tests have been drilled since then at some distance from the well. The new test is 40 feet from the old hole.

Duval County

Cin-Tex Petroleum Co.'s No. 6 Benavides is rigging up. Humphreys-Moody & Seagraves' No. 2 has completed a derrick and is moving in machinery on Block 5, Section 10. Gibson Oil Corp., on No. 1 Ayres, 1 mile east of the Cin-Tex discovery well, has cored a sandy shale at 1,560 feet, and resumed drilling. George M. Ball's No. 1 Roach, 2 miles east of Gibson, is down several hundred feet. Cole Petroleum Co. completed No. 18 Benavides offsetting the Cin-Tex discovery oil well and it came in a gasser. Cole is preparing to drill No. 19, 350 feet to the northwest of No. 18. Cole pulled in the crown block on No. 20 but has it repaired and the well nearly to the sand. It is in Block 8 of Section 10 and a half mile northwest of the Cin-Tex oil well and is surrounded by gassers. Derrick is up for No. 23 Benavides in Block 9 of Survey 8, which is in Webb County, west of the Cole Field and between the first three wells drilled by Cole north of Bruni and the Cole Gas Field. Cole has made a location for No. 25 Benavides in Block 1 of Survey 18, which is a full mile to the southeast of the Cin-Tex oil well and in new territory, and a mile south and a little west of where the Gibson Oil Corp. is drilling on Survey 353. Houston Oil Co. is preparing to pull liner in No. 2 Benavides in order to deepen. No. 4 Benavides is making a new test. No. 5 Benavides is testing after taking a good core. O. W. Killam completed No. 6 Benavides, a 40,000,000-foot gas well. Killam's No. 7 is drilling and nearly ready to set casing. Barkley & Meadows and William F. Morgan completed No. 1 on Block 4, Section 10 of the Cole Field, a 60,000,000-foot gas well. They are rigging up on No. 2 in the same block. O'Hern, Putnam and Seacord are preparing to drill on Survey 174, 5 miles south of the Cin-Tex well.

Among the wildcats in Duval County, Murchison & Fain are preparing to move in on the Brooks ranch north of the Cole Field a few miles. Benedum & Trees have spudded in No. 1 Southerland. Simms Oil Co. has abandoned its Bennett ranch test on Survey 37, 5 miles north of the Cole Field at 3,367 feet. It had few showings but not enough to warrant a test. Simms is moving tools to the Dinn ranch where the company will drill on the southwest quarter of the northeast quarter of Section 66.

Guadalupe County

J. M. Davis spudded in early last week in No. 1 Julius Schultze at New Berlin, in western Guadalupe County, and has been drilling for a week. Payne & Bond are drilling at about 400 feet 2 miles south of New Berlin.

Jim Hogg County

Simms Oil Co. is drilling No. 2 Palacious on Survey 291 in Jim Hogg County, in the new Randado Field, and is down close to the sand at 1,250 feet. Casing will probably be set this week. Location has been made for No. 3, on the same survey. No. 2 offsets the Houston Gulf Gas Co.'s No. 3, which came in at 1,250 feet making 2,000,000 feet of gas and 400 bbls. of oil. Simms is rigging up on the Leyendecker test on Block 7 of Survey 143 for a wildcat test. Andrews Petroleum Co. is moving in machinery to deepen No. 1 Merchant State Bank, which is standing at 2,380 feet. Houston Gulf Gas Co. has set casing at 1,251 feet in No. 4 Palacious, 300 feet west of No. 2, which is flowing 400 bbls. of oil daily. They are moving in on the location for No. 5, which is on Block 11 of Survey 291. William F. Morgan is interested in the tests and they have organized the Randado Pipe Line Co. and has some of the pipe already laid for a line seven miles north to connect with the Texpata Pipe Line in the Henne, Winch and Fariss Field. Houston Gulf Gas Co. and Morgan are keeping two rigs running continuously on their leases in Survey 291. Simms Oil Co. has closed a deal with the Grayburg for a block of leases including Surveys 81 and 83, and will drill on that. Simms Oil Co. now has 1,000 acres in the Randano Field, the largest close in block in the field. Magnolia has by far the largest block but considerable of it is some distance from production. Johnson and others (American Well & Prospect Co.) are drilling at 1,000 feet in No. 3 Palacious on Block 15 of Survey 291. Black & Huckson have the derrick up for No. 1 Palacious on Block 13 of Survey 291.

In the Henne, Winch and Fariss district, O. W. Killam has the derrick up for No. 2 Mann-Hinnant on Block 4 of Survey 256, west of the Holbien ranch. No. 1 was completed as a big gasser. Kitselman & St. Albans, after getting two oil wells and an additional gasser on the Holbien ranch, opening a new oil pool northeast of the Henne, Winch and Fariss Pool, tested No. 28 Holbien and got salt water. It is being plugged back and will be tested again. Depth was 2,147 feet. No. 30 is drilling below 200 feet, and No. 31 is drilling at 1,500 feet, and No. 32 has set casing at 2,127 feet. It is on Block 2 of Section 15 of the Holbien land, and is southwest of the oil well and in the direction of the Henne, Winch and Fariss Pool. No. 33 has the derrick up. Crown Central is starting a test on the Holbien ranch on Block 23 of Section 12, a half-mile west of the Kitselman & St. Albans discovery oil well. It is the first for the Crown Central outside of the Mirando Pool. Associated has spudded in No. 1 Lopez, on Block 21 of Share 1 of the Las Animas grant, more than a mile north of the Holbien ranch, and has made the location for No. 2 on Block 20 of Share 1 of the same tract. M. E. Weber has the derrick up for a test on Section 15 of the Holbien ranch.

Among the wildcats in Jim Hogg County, Murchison & Fain are drilling at 900 feet in No. 1 Yeager-Strohman, on Survey 452, in the northeast corner of the county. National Oil Co. is spudding in on No. 1 Allen. Previous reports that it was drilling, were in error. Benedum & Trees are getting ready to test in 15 feet of sand at 2,354 feet No. 1 Allen on the Wilbur Allen ranch, after setting 8¼-inch casing. They are drilling No. 3 at about 200 feet, and are spudding in No. 2. All three tests are on separate blocks on the Allen ranch. Simms Oil Co. is fishing for four joints of casing at 3,300 feet in No. 1 Blanchette on the Oscar Thompson ranch.

Jim Wells County

Benedum & Trees are drilling at 500 feet in No. 1 Gallagher, in Jim Wells County, south of Sandia.

LaSalle County

DeLange, Eiser Development Co. is drilling at 200 feet in No. 1 Dobie, in LaSalle County, having passed the boulders that were delaying drilling.

Live Oak County

Mid-Kansas Oil & Gas Co. has derrick up and is rigging up at Fant City, in northern Live Oak County.

Medina County

Operators who have been passing up the northern half of Medina County due to its being too close to the Balcones Escarpment and also because it was too badly broken up, are now putting their geologists into the field to gather new information. Shallow oil south of Hondo and other matters have caused them to want new information. Ina Oil Co. has secured a permit to drill No. 2 Viola Wilson on Block 99, Survey 251, Medina County. L. Smith has resumed drilling at 200 feet in No. 1 J. P. Nixon in Survey 531. Golden West has completed No. 5 Schmidt, and is drilling No. 6 Schmidt in the Ina Field. Medina Oil Co.'s No. 4 Taylor is drilling at 275 feet on a location 300 feet south of No. 1, which is producing at 357 feet. Same company is moving tools to No. 1 Haglen, 1½ miles south, and preparing to start a test on the August Mumme, a mile to the west. Doctor Schlottman, on the Ritcher, has set 8-inch casing at 250 feet and shut down. Yantis' No. 1 Haeglin is drilling at 200 feet. Golden West's No. 2 Odem is drilling at 455 feet, having passed the depth at which No. 1 Taylor is producing.

Al Buchanan is drilling at 270 feet in shale. K. Reager and others shut down at 1,001 feet in No. 1 Langfield, and is drilling at 200 feet in No. 1 Schrieber. Jameson and others are testing at 480 feet in No. 1 Mott. Kittle & Townley have replaced the spudding machine with a rig in No. 2 Ritcher and are drilling at 400 feet. Jacobs & Powell have abandoned at 430 feet No. 1 Haeglin, on Survey 1,473, having failed to find the 357-foot sand producing in No. 1 Taylor. Alamo Drilling Co. is drilling at 1,100 feet in No. 1 Bendele a little west of Noonan, and Hudson & Johnson have milled out the tools lost at 1,630 feet in No. 2 Christilles in the same neighborhood and are drilling at 1,700 feet. Ina Oil Co. is drilling at 200 feet in No. 1 Finger, a wildcat test, in the western part of the county, and are rigging up on No. 1 Hoffman on Survey 113. Henderson & Holden are drilling at 650 feet in No. 2 Adams, located 1,600 feet east of the gas well they recently completed on the Adams tract. Eastham & Tarver on Survey 91 on the Howard farm, a mile east of Henderson & Holden, are rigging up. Plateau is drilling at 1,300 feet in No. 1 Harrison on Survey 72½. The well relied mainly on shallow oil and has passed the shallow sands and is in the Austin chalk.

Milam County

Alexander & Lyles, Inc.'s No. 1 Seelke, three miles north of Rockdale in Milam County, got the top of the chalk at 2,144 feet and are drilling at 2,280 feet. The chalk is high and the log of the well is favorable thus far. The well is a wildcat, being some distance from the shallow production.

McMullen County

George M. Ball has started a test on the Kuykendall tract in McMullen County, a few miles west and a little north of Tilden, the county seat. Derrick is up and the well spudded in. The block of leases comprise 5,000 acres and the contract calls for two tests. It is pure wildcat and several miles from any test. F. J. Darlington has secured a permit to drill the Farmers Insurance Co.'s No. 1 in the old Crowther Field. Houston Gulf Gas Co. is fishing at 1,900 feet in No. 4 Jacobs, 3 miles northeast of the Callihan Field, a wildcat test that had a showing of oil at 1,250 feet.

San Patricio County

No. 7 Sigmund, at Aransas Pass, is drilling at 3,120 feet in sandy shale. The well is the seventh test in purely wildcat territory in San Patricio County, all of the tests getting more or less showings of oil or gas or both. No. 7 is now nearly at the depth where it expected to get production.

Terrell County

Leases in the Julian Basset ranch of 400,000 acres in Terrell County, have been assigned by W. H. Perot to the Cosmos Oil Co. of Delaware, as a preliminary move to the starting of the first of a number of tests. There are three structures that have been traced out on the ranch by geologists. Previous references to the deal have referred to Howard Smith, who is interested in the proposition. One other test has been started in Terrell County by E. T. Williams in Survey S 71-BD-10 I. C. Ry. It has been drilling for about a month. One other is soon to get under headway. James E. Dunn has transferred 98,000 acres of leases to the Gibson Oil Corp., the leases being long time and with no drilling obligations, but it is understood a test is planned.

Travis County

Gulf Production Co. spudded in late last week No. 1 Carlson in northeast Travis County, where Humble, Gulf and others have been drilling in hope of picking up production in Serpentine and with showings in Serpentine in previous tests that strengthen the hope.

Val Verde County

Plateau Oil Co. is down a few hundred feet in No. 1 Harrison in eastern Val Verde County.

Webb County

Magnolia has made location for No. 20 Ochoa on Lot 35 of the Walnut division of the Ochoa pasture in the Mirando Field. It is the first to be drilled in that territory for some time. George M. Ball has completed No. 1 Bruni in the center of the north line of the east half of Block 13 of the Bruni tract, swabbing about 400 bbls. daily. It is a good well and extends the field a half mile east; depth 1,766 feet. Ball has completed No. 2 on Block 45, 300 feet south of No. 1, which is also a good well at approximately the same depth. Corpus Christi Oil Co. is drilling at 1,500 feet in No. 1 Puig on Block 51. W. O. Wheatly, in the northwest corner of the east half of Block 43 of the Bruni land, has a fine core showing oil and that part of the Mirando Field seems destined for another extension of a half mile to the southeast. Ball extended it a half mile earlier in the week with his well on Block 13.

Simms Oil Co. spudded in last Friday in Block 10 of Survey 835 of the Bruni land south of the Aviators or Edgington Pool. Previous reports placed the well in Block 1 of the survey at the north end of the survey. O. W. Killam, at 1,634 feet in No. 1 Bruni, on Block 7 of Survey 835, last week completed a 35,000,000-foot gasser and is drilling deeper. Staley, Wynne & Co. completed No. 2, in the southwest corner of Block 13 of the Bruni land, swabbing 400 bbls. of oil, at 1,719 feet. Two tests of the Crown Central, on Block 14, are still waiting for machines to drill in. P. N. McCullough's No. 1 Benavides on Block 7 of Survey 125, has been abandoned at 1,810 feet, total depth. Three Rivers Oil Co.'s No. 3 Puig, on Block 75 of the Edgington subdivision swabbed 400 bbls. at a depth of 1,737 feet. It is the nearest producer to the Ball well on Block 13 of the Bruni land that extended the field last week. The next test by the Three Rivers Oil Co. will be on Block 76, the next block east. Gibson Oil Corp. has spudded in its No. 1 Bruni, in the northwest corner of Block 13 of the Bruni land. Laredo Oil Co. is rigging up for No. 11 Killam in the north end of the Mirando Field.

Carolina-Texas District

In the Carolina-Texas district in Webb County, Roark and others are drilling at 2,700 feet in No. 2 de la Garza on Block 11 of Survey 335. J. H. Hale has spudded

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SLICK	MARAMEC	ARKANSAS	
WYNONA	VAN	EL DORADO	

in on the Coe test on Survey 51, a couple of miles off to the southwest, from the Carolina-Texas gassers. Associated has abandoned No. 3 Webster at 2,209 feet, where it had a small gas well, but failed to complete it. It will start drilling a replacement well. Moody-Seagraves and Morgan are drilling at 3,024 feet in No. 2 de la Garza, on Block 61 of Survey 261, to the north of the Carolina-Texas gassers. It tested salt water at 2,788 feet. It cored a sand at 3,024 feet. United States Gas & Oil Co. is standing at 2,110 feet in No. 1 Benavides in Survey 679, waiting for completion of a water well. Another effort is to be made to close in the Johnson & DeTray wild gasser on Block 4 of Survey 1,012, that came in wild on January 26, and has been running wild ever since. Snowden-McSweeney have reset the second string of casing to shut out water at 2,138 feet in No. 2 de la Garza, in Survey 682, where they tested a 12,000,000-foot gasser. J. H. Winch is drilling at 800 feet in No. 1 de la Garza, in Block 12 of Survey 336.

In the district in Webb County in the Cole Gas Field, Cole Petroleum Co. has the derrick up for No. 10 "A" on Block 5 of Survey 3, where it recently drilled No. 10 to 2,693 feet where it was abandoned. Cole has locations for two other tests on the Webb County side of the Cole Field, but closer to the producing gas wells.

O. W. Killam is making location for No. 1 Driver, in Survey 52, southwest of the Carolina-Texas gassers and near the Coe test, on Survey 51. W. C. Ritchison is drilling at 1,840 feet in No. 1 A. S. Billings, on Survey 71, northeast of the Carolina-Texas gassers. Pittsburgh Oil Development Co. (Benedum & Trees) is preparing to drill on the Slator ranch in the Borrego grant, which is crossed by the Zapata-Webb County line. The test will be in Webb County.

Zapata County

Maurer & Duggan have spudded in on No. 1 Garaza, in Survey 244, a little south of the Webb County line for a wildcat test. Gleason has abandoned his No. 1 Benavides, in Block 12 of Survey 11, at 1,571 feet, and is moving to the location for No. 2 in Block 12 of Survey 9. Hill & Perkins' No. 1 Yeager-Strohman set casing at 2,001 feet in Survey 258, and is preparing to test. Total depth is 2,002 feet. Cullinan & Clark's No. 1 Hinnant are rigging up.

The Texas Company's No. 1 Jennings, the most watched wildcat in Laredo County at this time, is drilling below 4,000 feet, last depth reported being 4,031 feet. No. 1 had an enormous gas blowout at 3,965 feet, but due to the condition of the hole it could not be completed and was plugged and abandoned. No. 2 was drilled in a hope of picking up oil production at the level of the blowout. It got some gas and salt water and a little oil at 3,968 feet and passed another sand at 3,991-96 feet.

NORTH CENTRAL TEXAS

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oil and 50 bbls. of water (estimated) from sand at 1,410-12½ feet.

Archer County

The Texhoma Oil & Refining Co.'s No. 1 Katie Demgen was rigging rotary; No. 9 Hamilton pumped 142 bbls. from oil sand at 1,794-1,801½ feet. The Tidal Oil Co.'s No. 1 Mangold was drilling at 1,320 feet. Allday and others' No. 1 Hasson was drilling at 1,200 feet. J. D. Ashcroft and others had a rig up for No. 1 Clara C. Star. L. T. Burns' No. 3 A. P. Jackson pumped 40 bbls. the first 10 hours at 1,555-72 feet; his No. 4 was drilling at 1,100 feet; and No. 1-C McCrory, trustee, was drilling at 1,210 feet. The Consolidated Oil Co. and W. C. Young's No. 1 W. H. Taylor was dry and abandoned at 1,811 feet. The Empire Gas & Fuel Co.'s No. 1 Plowman and others was drilling at 200 feet. Granberry and others were rigging up a rotary for No. 1 A. B. Edwards. Hart & Hopkins' No. 1 G. W. Moss was good for 12 bbls. from broken sand at 928-35 feet.

Humble Oil & Refining Co. made a location for No. 2 A. P. Nichols, and was cleaning out No. 6-A Parrish and others after a 5-quart shot in oil sand at 1,570-78 feet; No. 9-B Parrish and others was a location.

M. L. Lewis and others' No. 1-B A. D. Thompson made 40 bbls. at 1,385-92 feet. T. G. Lomax, Jr. abandoned No. 2 "H" L. F. Watson at 1,600 feet, and staked a location for No. 1 "K" McCrory, trustee. C. B. Long was drilling No. 1 P. A. Newell at 100 feet. The Magnolia Petroleum Co.'s No. 1 J. M. Miller was drilling at 875 feet and No. 4 "B" May Rutty was completed for 50 bbls. at 896-903 feet. The Marland Oil Co. & Trahan were drilling at 540 feet in No. 1 Perkins and others. The McCarty Oil Co.'s No. 18 L. F. Wilson made 30 bbls. from oil sand at 1,364-67 feet, broken sand 1,367-82 feet and oil sand 1,382-84 feet; No. 24 "B" L. F. Wilson made 12 bbls. from broken sand and shale 893-906 feet; No. 25-"B" was rigging up rotary; and the location for No. 7-C was abandoned.

Dry and Abandoned

Muse & Robertson's No. 1 J. M. Hawley was dry and abandoned at 1,836 feet. T. A. Norwood's No. 2 May Rutty had sand at 906-18 feet, total depth 1,430 feet, but failed to produce. Fred Phillips and others' No. 1 B. Z. Lyles bailed salt water from oil sand at 1,671-76 feet. The Richardson Oil Corp.'s No. 1 Netherton was drilling at 1,083 feet. Riner & Bailey's No. 1 T. J. Moss was drilling at 1,380 feet, having failed to pick up the 900-foot sand. Ranning & Saunders' No. 1 L. F. Wilson was dry and abandoned at 1,650 feet. The Rowe Drilling Co.'s No. 1 Hutcheson was also a failure at 1,470 feet. The Simms Oil Co. and Consolidated Oil Co.'s No. 1 S. M. Cowan estate, was likewise a failure at 1,510 feet.

The Atlantic Oil Producing Co.'s No. 3 Oldham had sand at 1,305-12 feet and was cleaning out. It also had shale from 1,312-44 feet. A rig was up for the Barnsdall Oil Corp.'s No. 1 Wolf. Bridwell & Heydrick had a show in sand at 1,220-22 feet in No. 1 Hamilton and were drilling deeper. Roy I. Carter's No. 5 Cowan estate, had dry sand at 1,053-62 feet and was abandoned; No. 6 Cowan estate was rigging rotary. Cook & Reeder's No. 1 Ray and Massie was drilling at 300 feet. J. S. Cosden and Consolidated Oil Co.'s No. 6-A Oldham found sand at 1,347-65 feet dry and the well was abandoned; No. 4-B was also abandoned at 1,354-63 feet; No. 5-B was testing oil sand at 1,363-64 feet; No. 1-C made 5 bbls. initial at 1,371-94 feet; and No. 1 Richardson was dry and abandoned at 1,400-02 feet.

Homer Donohue's No. 1 Andrews made 15 bbls. at 870-81 feet. Flowers & Winters' No. 1 McCarty was a location. Golding & Cochran were drilling No. 1 O'Donnell at 300 feet. Gwynn and others' No. 1 Echols was dry and abandoned at 1,322 feet. Hines and others had a rig for No. 1 Richardson. Hooper & Graves' No. 1 Robinson was testing sand at 628-46 feet. The Humble Oil & Refining Co.'s No. 3 Wolf was cleaning out after a 10-quart shot in sand 1,362-65 feet; No. 5 Wolf was dry and abandoned at 1,360 feet after getting a show of oil in sand at 1,323-30 feet; No. 6 Wolf was drilling at 1,213 feet.

Magnolia Operations

The Magnolia Petroleum Co. was rigging up rotary for No. 3 Coffield, and testing sand at 1,265-67 feet in No. 1 Little; No. 8 Rogers had sand at 1,381-84 feet making 20 bbls. of oil and 80 bbls. of salt water initially.

The Pandem Oil Corp.'s No. 1 Thomas was a location. The Prairie Oil & Gas Co.'s No. 3 Kovar was completed for 3 bbls. at 1,382-96 feet. Ray & Massie had a rig up for No. 1 Jeske. E. A. Reilly was drilling gas sand at 1,182-86 feet in No. 1 Wilhelm. A rig was up for the Roxana Petroleum Corp.'s No. 1 Abercrombie. The Sun Oil Co. was rigging up rotary for No. 6 Kunkel. The Texas Company's No. 1 Key was dry and abandoned at 1,821 feet. The Texas-Consolidated Oil Co.'s No. 3 Wolf, bailed salt water from sand at 1,346-51 feet; No. 6 Abercrombie was testing sand at 1,332-62 feet; No. 3-A Abercrombie was dry and abandoned at 1,375 feet; the location for No. 2 Jeske was abandoned; No. 1 Kunkel was drilling at 850 feet; and No. 2 at 855 feet; No. 7-A Wolf was being put on the pump at total depth of 1,337 feet, sand at 1,332-36 feet. The Trinity Townsite Co.'s No. 3 fee was completed for 50 bbls. at 1,438-46 feet. The United Producers' No. 1 Prideaux had sand at 663-80 feet but had to reseat casing after a shot; No. 1-A Prideaux was drilling at 100 feet. Whittiken and others' No. 1 Inmon and others was a location.

Young County

The Atlantic Oil Producing Co.'s No. 1 B. Rachuig swabbed 100 bbls. from sand at 1,157-66 feet. Barclay and others' No. 1 Rogers is a location. The Booth Oil Co.'s No. 2 Graham pumped 24 bbls. from sand at 1,102-05½ feet. R. I. Carter's No. 8 Benson made 110 bbls. initial from sand at 920-35 feet; No. 9 was rigging up rotary. Cook & Reeder abandoned No. 1 Keen as dry at 507 feet. The Howard Petroleum Co. made location for No. 3 Stewart.

The Humble Oil & Refining Co.'s No. 11 Mercer was dry and abandoned at 1,125 feet with no sand; No. 12 was drilling at 230 feet. The Ilseng Production Co. spudded No. 1 Sloan. Long and others tested No. 2 McCaghren at 956-58 feet. McElreath & Suggett's No. 1 Cox had a good show in sand at 546-47½ feet but was dry and abandoned at 560½ feet. The same interests and Phillips Petroleum Co.'s No. 1 Snyder filled up 65 feet in 8 hours from oil sand at 579-86 feet. Murchison & Fain and Marland Oil Co.'s No. 2-C Campbell was dry and abandoned at 1,065 feet with no sand. The Prairie Oil & Gas Co.'s No. 6 Boren was preparing to pump at 1,064-74 feet with 950 feet of oil in the hole. Wilson and others' No. 8 Beardon was shot with 3 quarts and had 100 feet of oil in the hole from sand at 1,262-83 feet.

Callahan County

Adams and others' No. 1 Windham was setting 8-inch at 1,028 feet. Canary and others' No. 1 Cutbirth was a rig. Diamond's No. 1 Terry was drilling on top of sand with a show of oil. Gibson & Johnson were rigging up No. 1 Boydston, and were drilling No. 1 Smith at 200 feet. The Halmack Oil Co. and Pennant Oil & Gas Co.'s No. 1 Conlee was dry and abandoned at 2,950 feet. The Hughes Development Co. had rig and tools for No. 1 Freeland. Ingleright's No. 1 Minnock was drilling at 500 feet. The Mission Drilling Co.'s No. 1 Moore was a rig. C. O. Moore was drilling No. 1 Brasher at 1,675 feet. The Pandem Oil Corp. had a location for No. 1 Cutbirth. The Pennant Oil & Gas Co. was drilling No. 1 Robbins at 220 feet. Redmond's No. 1 Atchley was drilling at 1,700 feet. Reeves & Meredith staked a location for No. 1 Hall, and the White Eagle Oil & Refining Co. staked one for No. 1 Alvard.

Taylor County

Sanger Oil & Ref. Co.'s No. 1 Norwood was drilling at 2,100 feet.

Howard County

The Deep Rock Oil Co.'s No. 1 W. T. Scott was shut down at 3,605 feet for orders. The Marland Oil Co.'s No. 1 O'Daniel was put on the pump at 3,103 feet. Owens & Sloan's No. 1 Chalk pumped 47.5 bbls. on April 27 and 38 bbls. on the following day, making a total of 340.5 bbls. to that date. Carey & Ferguson staked a location for No. 1 Dora Roberts and the Magnolia Petroleum Co. made one for No. 1 Otis Chalk. The Transcontinental Oil Co.'s No. 1 Roberts had a hole full of water in sand at 2,205-55 feet and was drilling at 2,310 feet.

Culberson County

The Deep Rock Oil Co.'s No. 1 Kloh & Rumsey was drilling at 200 feet. The Pure Oil Co.'s No. 1 Mrs. G. H. Quaid was drilling at 2,640 feet.

Coke County

The Lipan Oil Co.'s No. 1 E. C. Rawlings was drilling at 2,305 feet.

Brown County

Anderson & Shults' No. 1 Allgood was dry and abandoned at 1,312 feet; No. 1 Dunn was drilling at 820 feet. Ballard & Underwood's No. 1 Hickman was drilling at 200 feet. The Barbour Oil Co.'s No. 1 Newton was drilling at 560 feet; No. 1 Suttles was good for 40 bbls. at 1,132-44 feet. Barkley & Conway's No. 1 Allen was drilling at 400 feet. No. 6 Dunn was drilling at 1,025 feet and No. 7 Dunn was good for 100 bbls. at 1,114-33 feet. Bowers' No. 1 Graham estate, was a location. Berryman and others had a machine for No. 1 McClanahan. Boysen & Ramsier were drilling No. 1 Boysen at 2,393 feet. The Conway Brothers were rigging up No. 7 Chambers, and were cleaning out No. 4 Wooldridge after a 30-quart shot at 1,231-60 feet. J. S. Cosden's No. 9 Baxter was a location abandoned; his No. 9 Westerman made 375 bbls. at 1,277-95 feet; and a location was staked for No. 10 Westerman. Cosden's No. 1-A Williams had water trouble at 1,165 feet; No. 2-A Williams was drilling at 200 feet.

Curry and others' No. 1 Kilgore Brothers was drilling at 850 feet. Curry & Moore's No. 1 Church lot was spudded; No. 1 Pickett was drilling at 800 feet; No. 1-A Pickett was a location; No. 1 Wooldridge was a location. Denny's No. 1 Carson was dry and abandoned at 2,475 feet. Gholson had a rig up for No. 1. Williams and Gibson was fishing for tools in No. 1 Carmichael. Gillespie's No. 3 Newton was estimated good for 200 bbls. at 1,272-89 feet. Gillman & McMurray's No. 4 Thompson made 75 bbls. from sand at 1,221-37 feet; No. 5 was rigging up. The Hepburn Oil Co.'s No. 3 Gaines was a location.

Holdeman's No. 1 Kellar was drilling at 210 feet. The Hughes Development Co.'s No. 4 Arledge was drilling at 920 feet; No. 5 at 450 feet; No. 6 at 1,070 feet; No. 7 rigging up; No. 8 rigging up; No. 9 location.

Hutchinson County

The American Refining Co.'s No. 1 J. A. Whittington, was pumping 50 bbls. from sand at 2,790-2,800 feet. Dunnigan and others' No. 1 J. A. Whittington flowed 1,000 bbls. the first 24 hours after a shot from sand at 2,938-3,026 feet, total depth being 3,033 feet. Lenix & Pattison's No. 1 H. E. Smith and others flowed 5,850 bbls. the first day and 4,164 bbls. the second 24 hours from sand at 2,910-95 feet, total depth being 3,005 feet. The Phillips Petroleum Co.'s No. 3 H. E. Smith and others, swabbed 242 bbls. at 2,814-62 feet after shooting. The same company and others' No. 1 Johnson Brothers flowed 1,600 bbls. in 24 hours from sand at 2,980-82 feet. The Travelers Oil Co.'s No. 1 W. L. Kingsland, flowed 180 bbls. in the first 24 hours after shooting. Sand record is 2,870-2,945 feet.

The Apex Oil Co. was building a rig 330 feet each way from the SE cor. E half NW SW, Section 11, Block Y, M. & C. Survey. In the same section, 330 feet each way from the NE cor. SE NE, the Echo Oil Co. had a rig completed for No. 1, and the same company was building a derrick for No. 2, 330 feet each way from the NW cor. SW SW, same section. The Empire Gas & Fuel Co. had a rig up 330 feet from the north and east lines of Section 19, Block Y, M. & C. Survey. The same company staked a location 330 feet each way from the SE cor. of the south 240 acres, Section 68, Block 46, H. & T. C. Survey.

The Get Oil Co.'s No. 1 Allen had a rig up, located 9,833 feet south and 8,823 feet east of the NW cor. of Jose de Jesus Rodriguez Survey.

The Gibson Oil Co.'s No. 1 McCormick estate, 330 feet each way from the NE cor. SW, Section 18, Block M-23, had a rig building. Madden and others' No. 1 Harvey, 330 feet each way from the NE cor. SW, Section 5, Block L, E. L. & R. R. Survey, was a location.

The Marland Oil Co. is building a rig for No. 1 Weatherly, 330 feet from the north and east lines of S half SE, Section 19, Block Y, M. & C. Survey. A location was also staked by the Phillips Petroleum Co. for No. 1 Neil, 7,546 feet from the south and 1,328 feet from the

west lines, Section 68, Block 46, H. & T. C. Survey. The same company also staked another location for No. 2 Smith-Capers, 330 feet each way from the NW cor. W half NE, Section 12, Block Y, M. & C. Survey, and another for No. 9 Whittenburg (Coble), 330 feet each way from the SE cor. S half NW, same section, and for No. 10 Whittenburg (Coble) 330 feet each way from the NW cor. of Section 12, Block Y.

The Relief Oil Co. was building a rig for No. 3 Smith, 330 feet from the north and west lines of Section 11, Block Y. Smith & Bynum were likewise building a derrick for their No. 2 Whittenburg, 255 feet from the south line and 330 feet from the east line N half NE SW, Section 12, Block Y. The Sunny Jim Oil Co. had a rig on the ground for No. 3 Whittenburg, 330 feet each way from the NE cor. NE SW, Section 12, Block Y. The Texhoma Oil & Refining Co. was building a rig for No. 1 Whittenburg, 330 feet from the south line and 990 feet from the east line of the N half, Section 62, Block 46, H. & T. C. Survey.

Carson County

The Marland Oil Co.'s No. 1 Burnett estate, was flowing 500 bbls. daily from sand at 3,125-35 feet.

W. W. Silk had a rig and tools for No. 6 Burnett, 450 feet each way from the SW cor. NW, Section 115, Block 5, H. & G. N. Survey.

Gray County

The Empire Gas & Fuel Co.'s No. 1 Heithholt, estimated good for 15 bbls. on the pump from sand at 3,164-69 feet, total depth 3,258 feet.

Wichita County

Fisher & Gilliland's No. 1 Chilson, was dry and abandoned at 1,821 feet. Another failure is the Petroleum Producers and United Production Co.'s No. 1 Dutton, at 1,850 feet. The Simms Oil Co.'s No. 1 Dutton "A," made 25 bbls. from sand at 1,816-27 feet and No. 2 was abandoned at 1,830 feet.

The Atlantic Oil Producing Co.'s No. 1 Waggoner "G" was dry and plugged at 2,007 feet and the Dale Oil Corp.'s No. 21 Jennings was likewise abandoned as dry at 1,850 feet.

The Humble Oil & Refining Co.'s No. 3 Waggoner "D" was a 10-bbl. well at 592-98 feet; No. 3 Mitchell-Waggoner was a 5-bbl. producer at 3,828 feet. The Magnolia Petroleum Co.'s No. 16 Pratt "A" was good for 7 bbls. at 799-804 feet. John O'Neil abandoned his No. 24 Rio Bravo at 2,417 feet and No. 3 Roberts at 1,945 feet.

The Petroleum Producers Co.'s No. 3 Douglas made 25 bbls. from sand at 1,608-25 feet. The Ryan Petroleum Co.'s No. 59 Nance is a 35-bbl. well at 1,207-19 feet and No. 60 Nance made 60 bbls. from sand at 1,287-1,325 feet. The United Production Co. abandoned its No. 1 Snow as dry at 1,875 feet.

Wilbarger County

Barkley & Meadows' No. 1 Bond was dry and abandoned at 2,020 feet. The Empire Gas & Fuel Co.'s No. 18 Stephens was flowing 200 bbls. at 2,282-87 feet and No. 30 Stephens was good for 125 bbls. on the pump after plugging back from 2,330 feet to sand at 2,265-75 feet. No. 36 Stephens made a 75-bbl. pumper at 1,247-64 feet.

J. B. Garretson's No. 1 Waggoner was abandoned at 2,604 feet. The Independent Oil & Gas Co.'s No. 1 Waggoner was dry and abandoned at 2,915 feet. The Milham Corp.'s No. 2 Waggoner "B" was flowing 200 bbls. from sand at 2,541-49 feet. This well was drilled deeper from 2,400 feet. The same company's No. 2 Waggoner "L" was a 200-bbl. pumper from sand at 1,912-24 feet.

Murchison & Pigg temporarily abandoned their No. 3 Ditto, at 2,710 feet. The Phillips Petroleum Co.'s No. 6 Waggoner "G" pumped 200 bbls. from sand at 1,849-73 feet. The Waggoner Refining Co.'s No. 1 Waggoner "A" pumped 300 bbls. at 1,898-1,921 feet. G. C. Wood abandoned his No. 1 McGill as dry at 965 feet.

Archer County

A duster was abandoned by L. T. Burns in No. 1 L. F. Wilson, Section 63, at 1,655 feet. F. H. Gohlke's No. 1 McCrory, trustee, had sand at 1,569-70 feet, total depth 1,573 feet. It was plugged back 3 feet and completed as a 12-bbl. well. The Humble Oil & Refining Co.'s No. 10 Parrish and others made 15 bbls. at 1,570-78 feet. Maer & Staniforth's No. 1 J. W. Prescott was dry and abandoned at 2,002 feet. Riner & Bailey's No. 1 H. W. Preston was dry and abandoned at 1,660 feet and another duster was Sorsfield & Maxwell's No. 1 R. L. Sloop at 990 feet.

The Camp Oil & Gas Co. and Atlantic Oil Producing Co.'s No. 1 Rachuig, was a 10-bbl. well at 1,168-82 feet. Flowers and others abandoned No. 1 McCarty at 1,507 feet and Ted Harris and others plugged their No. 1 Connor at 1,350 feet. Hammond & Hines had a 25-bbl. well in No. 1 Richardson at 1,396-1,403 feet.

The Humble Oil & Refining Co.'s No. 8 Hamilton was good for 60 bbls. at 1,238-48 feet; No. 4 Wolfe made 80 bbls. at 1,338-57 feet. The Ilseng Production Co.'s No. 2 Prideaux, Block 16, made 35 bbls. at 634-48 feet. The Pandem Oil Corp.'s No. 1 Coffield was dry and abandoned at 1,445 feet.

Shaw & Rathke's No. 1 Prideaux made 51 bbls. at 632-52 feet. The Sun Oil Co.'s No. 1 Brown swabbed 400 bbls. from sand at 1,144-55 feet. The Texas Company's No. 9 Jeske swabbed 58 bbls. at 1,151-70 feet; No. 10 Jeske swabbed 267 bbls. at 1,142-63 feet; No. 8 Richardson swabbed 138 bbls. at 1,388-93 feet; and No. 1 Wright made 20 bbls. from sand at 1,396-98 feet with total depth at 1,400 feet.

A trio of dusters were abandoned. These were the Texhoma Oil & Refining Co.'s No. 2 Abercrombie & Taylor "A," at 1,415 feet; and No. 4 Wolfe "B" at 1,401 feet and the Tidal Oil Co.'s No. 1 Terrell at 708 feet.

Montague County

Lesh, McCall & Kilcrease had a 60-bbl. producer in No. 2 R. Hinds at 962-80 feet. The Texhoma Oil & Refining Co.'s No. 6 Rowland and others "A" was also a 60-bbl. completion in sand at 1,082-1,129 feet, total depth being 1,130½ feet.

Young County

The Atlantic Oil Producing Co.'s No. 2 Rachuig "B" swabbed 90 bbls. from sand at 1,163-74 feet. Bridwell & Heydrick's No. 5 Farmer made 7 bbls. at 1,053-61 feet and No. 6 Street was abandoned at 1,340 feet. Roy I. Carter's No. 7 Benson was good for 125 bbls. at 915-28 feet. Clark and others' No. 2 Leath made 25 bbls. from sand at 1,005-07 feet. Gwynn and others' No. 1 Winkler was dry and abandoned at 1,302 feet. The Howard Petroleum Co.'s No. 1 Stewart pumped 100 bbls. from sand at 551-58 feet. The Plains Production Co.'s No. 2 Farrow was dry and abandoned at 1,140 feet. Nash and the Windfohr Oil Co.'s No. 3 Williams "B" swabbed 75 bbls. at 2,435-64 feet.

Throckmorton County

The Associated Petroleum Co.'s No. 3 Cummings was dry and abandoned at 1,000 feet and the same company's No. 2 Kelley was also dry at the same depth.

Scurry County

Morrison & Fairchild's No. 1 Towle was a location abandoned.

Jones County

A duster was abandoned by the Red Bank Oil Co. in No. 1 Alexander at 2,340 feet.

Shackelford County

Dunbar and others' No. 1 Mathews was dry and abandoned at 1,002 feet. Roeser & Pendleton completed a 1,400-bbl. flowing well in No. 1 Cook-B Section 85, at 1,220-35 feet.

Stephens County

Eidson and others' No. 4 Crowley pumped 8 bbls. from a total depth of 1,882 feet. The Mook-Texas Oil Co.'s No. 4 Head was dry and abandoned at 2,228 feet. Walker-Caldwell Production Co.'s No. 1 Keathley was also dry and abandoned at 3,545 feet.

Eastland County

Three dusters comprised all of the completions. The Prairie Oil & Gas Co.'s No. 2 Brelsford was dry at 3,335 feet. The Robert Oil Corp.'s No. 1 Brasheur was plugged at 3,450 feet, and Goodwin & White's No. 1 Brunett, was a failure at 3,362 feet.

Callahan County

The Canyon Oil & Gas Co.'s No. 1 Derrington made 100 bbls. from sand at 1,402-10 feet; No. 4 Barr was a 15-bbl. well at 1,424-38 feet. The Mook-Texas Oil Co.'s No. 1 Baum, was a 1,000,000-foot gasser at 1,625-35 feet.

Mitchell County

The Eastland Oil Co.'s No. 1 Handley swabbed 25 bbls. from sand at 2,995-3,010 feet. The Marland Oil Co. abandoned No. 1 Shumaker as dry at 3,377 feet. The Magnolia Petroleum Co.'s No. 3 C. M. Adams swabbed 90 bbls. from sand at 2,942-3,060 feet.

Howard County

Owens & Sloan's No. 1 Chalk flowed 70 bbls. the first 24 hours, 60 bbls. the second, from sand at 1,577-86 feet after running tubing with packer.

Glasscock County

The Marland Oil Co. abandoned No. 1 Neal as dry at 3,302 feet.

Coleman County

Evans and others' No. 1 Vaughn made 5 bbls. of oil and 1,500,000 feet of gas at 940-48 feet. Raney and others' No. 1 Overall was dry and abandoned at 1,405 feet.

Brown County

Anderson & McCamey's No. 1 Williams was dry and abandoned at 2,800 feet. The Barbour Oil Co. had a 10-bbl. well in No. 4 Prather "A" at 1,308-19 feet. Barkley & Co.'s No. 8 Dunn made 25 bbls. from sand at 1,117-33 feet. The Conway Brothers' No. 6 Chambers was good for 250 bbls. at 1,292-1,306 feet. J. S. Cosden's No. 7 Westerman made 100 bbls. at 1,276-90 feet and No. 8 was dry and abandoned at 1,330 feet; No. 2 Williams was a 75-bbl. producer at 1,144-56 feet.

The Hepburn Oil Co.'s No. 2 Gaines made 6 bbls. from sand at 1,316-33 feet. The Mahlstedt Oil Co.'s No. 1 Eubanks was dry at 1,235 feet. The Prairie Oil & Gas Co.'s No. 14 Gaines made 50 bbls. from sand at 1,257-77 feet while No. 6 Newton was dry and abandoned at 1,333 feet. The States Oil Corp.'s No. 2 Allen "C" was another failure at 1,315 feet; No. 3 Allen "C" was also dry and abandoned at 1,339 feet. The Arkansas Fuel Oil Co. plugged No. 1 Gaines at 1,724 feet.

Comanche County

The Milham Corp. abandoned No. 1 Powers as dry at 3,120 feet.

Reagan County

The Marland Oil Co.'s No. 1 Cole was dry and abandoned at 1,786 feet. The Texon Oil & Land Co.'s No. 1-B University Group 1, made 350 bbls. from sand at 2,462-69 feet. The location for No. 7-A was abandoned.

Upton County

The Marland Oil Co.'s No. 3 Burleson flowed 60 bbls. on April 19 after deepening to sand at 2,111-21 feet, 65 bbls. April 20, 72 on April 21 and 65 bbls. on April 22.

Crane County

The Magnolia Petroleum Co.'s No. 1 University was put on the pump April 19 when it made 145 bbls. of oil and 60 bbls. of water from sand at 3,039-40 feet. The second day's production was 190 bbls. of oil and no water but only 45 bbls. of oil was pumped with 60 bbls. of water during a part of the third day. The tubing was being pulled.

The Marland Oil Co.'s No. 1 Cowden Brothers was dry and abandoned at 3,483 feet.

Crockett County

The Humble Oil & Refining Co.'s No. 1 P. J. Sorg was flowing about 1 bbl. daily from sand at 2,651-80 feet and was shut down for orders. Locations were abandoned for the Marland Oil Co.'s No. 1 University, Section 5, and No. 1 University, Section 26.

Moore County

The Prairie Oil & Gas Co. has a location for No. 2 J. T. Sneed, 660 feet from the north line and 3,300 feet from the east line of Section 26, Block 6-T, T. & N. O. Survey.

Cadman & Martin were drilling at 110 feet in No. 1 Sneed, Section 68, Block 3. Clark, Harbin & Baldridge's No. 1 Gober in Section 16, Block M-1, is a location. A rig was being built for Flowers' No. 1 J. T. Sneed, Section 25, Block I. Morton and others' No. 1 Rubert, Section 191, Block 3-T, is a location. The Phillips Petroleum Co. was drilling at 1,280 feet with the 12-inch set at 1,028 feet in No. 1 A. T. Sneed, in the N. Jones Survey. The Moore Oil Co. set the 15-inch at 500 feet in No. 1 J. T. Sneed, in the T. & N. O. R. R. Survey.

Production By Fields

Production by fields for week ending April 29, follows:

Electra

Atlantic Oil Prod. Co.	62
Empire Gas & Fuel Co.	663
Gulf Production Co.	959
Humble Oil & Refining Co.	130
Magnolia Petroleum Co.	3,177
Panhandle Refining Co.	53
Phillips Petroleum Co.	16
Prairie Oil & Gas Co.	119
Rio Bravo Oil Co.	598
The Texas Company	3,494
Texhoma Oil Refining Co.	1,466
Miscellaneous	6,080
Total	16,817

Burkburnett

Gulf Production Co.	451
Humble Oil & Refining Co.	380
Magnolia Petroleum Co.	2,641
Panhandle Refining Co.	255
Prairie Oil & Gas Co.	30
Sinclair Oil & Gas Co.	46
Skelly Oil Co.	159
The Sun Co.	60
The Texas Company	332
Texhoma Oil & Refining Co.	568
Miscellaneous	7,360
Total	12,282

Iowa Park

Atlantic Oil Producing Co.	101
Gulf Production Co.	118
Humble Oil & Refining Co.	161
Magnolia Petroleum Co.	410
Panhandle Refining Co.	35
Roxana Petroleum Corp.	9
Simms Oil Co.	18
The Texas Company	234
Texhoma Oil & Refining Co.	211
Miscellaneous	3,100
Total	4,397

Wilbarger

Atlantic Oil Producing Co.	100
Empire Gas & Fuel Co.	1,487
Gulf Production Co.	40
Humble Oil & Refining Co.	3,811
Phillips Petroleum Co.	4,027
Prairie Oil & Gas Co.	133
Roxana Petroleum Corp.	512
The Texas Company	47
Texhoma Oil & Refining Co.	101
Miscellaneous	4,056
Total	14,314

Archer

Atlantic Oil Producing Co.	255
Barnsdall Oil Co.	1,419
Cosden Co.	1,017
Empire Gas & Fuel Co.	677
Gulf Production Co.	3,308
Humble Oil & Refining Co.	1,746
Independent Oil & Gas Co.	25
Magnolia Petroleum Co.	1,413
Marland Oil Co.	420
Panhandle Refining Co.	154
Phillips Petroleum Co.	811
Prairie Oil & Gas Co.	2,297
Roxana Petroleum Corp.	397
Simms Oil Co.	644
Sun Oil Co.	202
The Texas Company	3,465
Texhoma Oil & Refining Co.	3,677
Tidal Oil Co.	55
Miscellaneous	13,294
Total	35,196

Young

Gulf Production Co.	314
Humble Oil & Refining Co.	300
Magnolia Petroleum Co.	172
Marland Oil Co.	1
Mid-Kansas Oil & Gas Co.	10
Panhandle Refining Co.	145
Phillips Petroleum Co.	20
Prairie Oil & Gas Co.	10
Roxana Petroleum Corp.	138
Simms Oil Co.	794
Sinclair Oil & Gas Co.	351
Sun Oil Co.	60
The Texas Company	505
Texhoma Oil & Refining Co.	293
Tidal Oil Co.	158
Miscellaneous	3,507
Total	6,778

Stephens

Arkansas Fuel Oil Co.	25
Empire Gas & Fuel Co.	25
Gulf Production Co.	1,419
Humble Oil & Refining Co.	675
Magnolia Petroleum Co.	375
Mid-Kansas Oil & Gas Co.	2,050
Phillips Petroleum Co.	355
Prairie Oil & Gas Co.	850
Republic Production Co.	135
Roxana Petroleum Corp.	60
Simms Oil Co.	40
Sinclair Oil & Gas Co.	75
Sun Oil Co.	145
The Texas Company	1,025
Texas Pacific Coal & Oil Co.	1,125
Miscellaneous	4,945
Total	13,354

Shackelford

Empire Gas & Fuel Co.	25
Humble Oil & Refining Co.	210
Magnolia Petroleum Co.	85
Phillips Petroleum Co.	690
Prairie Oil & Gas Co.	15
The Texas Company	210
Texhoma Oil & Refining Co.	70
Miscellaneous	2,175
Total	3,480

Ranger

Arkansas Fuel Oil Co.	5
Gulf Production Co.	224
Humble Oil & Refining Co.	70
Magnolia Petroleum Co.	775
Mid-Kansas Oil & Gas Co.	145

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BUTLER, PA., U. S. A.

Panhandle Refining Co.	125
Phillips Petroleum Co.	5
Prairie Oil & Gas Co.	590
Republic Production Co.	50
Simms Oil Co.	35
Sinclair Oil & Gas Co.	325
The Texas Company	165
Texas Pacific Coal & Oil Co.	830
Miscellaneous	2,650
Total	5,994
Eastland-Comanche	
Empire Gas & Fuel Co.	10
Humble Oil & Fuel Co.	75
Magnolia Petroleum Co.	650
Mid-Kansas Oil & Gas Co.	165
Phillips Petroleum Co.	50
Prairie Oil & Gas Co.	85
Sinclair Oil & Gas Co.	20
Skelly Oil Co.	115
The Texas Company	105
Miscellaneous	750
Total	2,025
Brown	
Cosden Co.	625
Humble Oil & Refining Co.	750
Prairie Oil & Gas Co.	325
Simms Oil Co.	50
The Texas Company	775
Witherspoon Oil Co.	25
Miscellaneous	5,015
Total	7,565
Callahan	
Humble Oil & Refining Co.	2
Phillips Petroleum Co.	20
The Texas Company	215
Texas Pacific Coal & Oil Co.	25
Witherspoon Oil Co.	5
Miscellaneous	3,060
Total	3,327
Miscellaneous Pools	
Reagan County	32,621
Clay County	476
Montague County	2,544
Jack County	90
Throckmorton County	600
Baylor County	182
Palo Pinto County	565
Coleman County	960
Scurry County	50
Mitchell County	3,372
Crockett County	476
Upton	209
Panhandle	
Carson County	2,456
Hutchinson County	10,788
Wheeler County	96
Gray County	487
Total North Texas	181,501

RAISES IN TANK WAGON AND OKLAHOMA MARKET

(Continued from Page 28)

parts of the country, which has tended to hold back motor consumption. But this consumption is expected to increase very rapidly when the motoring season begins in earnest

Although some large jobbers already have their stocks well provided for as far as a month in advance, there naturally will be many jobbers who will have to come into the market steadily from now on to cover the needs of the increasing consumption.

Some purchases have been made by marketers over the month as low as ½ to ¾ cent below present spot markets but these are thought to be comparatively few as most refiners were slow to make these kind of sales. These purchases offer a source of supply for the close buyer but they will not be dumped on the market unless the refinery market shows signs of easing up before the last of the month.

Gasoline and Naphtha

All grades of gasolines and naphthas set new high prices for the year and were firm at these figures. The U. S. Motor (58-60 437), while not tight, was not available Tuesday under 11¼ cents and many refiners were quoting 11½ cents. These prices were largely due to adjusted conditions following the general tank wagon advance of 1 cent in the Standard Oil Co. of Indiana territory, and represented an increase of ¾ cent over quotations of a week ago. The 56-58 450 gasoline also was sold above the 11-cent mark. A better demand for naphthas was reported, with prices from 11½ to 11¾ cents.

The increase of ½ cent in export postings strengthened the position of higher gravities with the 64-66 375 product quoted at 12¾ to 13 cents and the 60-62 400 material at 12¼ to 12½ cents. Exporters purchased from 1,500,000 to 2,000,000 gallons of these grades from Oklahoma and North Texas during the week, which served to remove any distress material. Exporters still are reported ready to buy but are offering only 12½ cents for the 375 product.

Kerosene and Distillates

The increase of a cent in kerosene prices during the week represented a 2-cent climb in the last two weeks. Refiners still are reported far behind on their orders and are easily getting from 9¼ to 9½ cents when they sell. A third increase in the Standard Oil Co. of Indiana tank wagon postings since the middle of April was the direct reflection of the refinery kerosene strength.

Distillates were somewhat puzzling to market students. Although slightly firmer, they were not as strong as might be expected with the extreme scarcity of kerosenes. With the high kerosene prices it was thought distillates would be rerun which would place them on a premium also. However, prices of distillates were practically unchanged Tuesday over a week ago.

Natural Gasolines and Blends

Natural gasolines Tuesday were in a very speculative position and spot markets were extremely uncertain. Buyers reported great difficulty in getting quotations even from manufacturers known to have the material. General ideas of the market ranged from 10½ to 11 cents on the A grades; 10 to 10¼ on the B grades, and 9½ to 9¾ cents on Grade C. These quotations were from 1 cent to 1½ cents higher than those of a week ago although inquiries still were not brisk. Manufacturers admitted having gasoline but explained they did not wish to quote or sell until they saw what conditions were going to be.

A good demand was reported for blends but that field was limited to a few manufacturers. Prices on the 60-62 and the 64-66 products, the only two grades now being manufactured, were higher in line with advances in straight run products.

Fuel Oil and Gas Oil

Another week passed without any indication of weakening in fuel oil and gas oil with markets on both products practically unchanged over a week ago. Outside of this there was little of interest along this line as most eyes were turned on the lighter oils. There was little demand for fuels and, on the other hand, there was little offered, with the bottom still at $1.30.

REDUCTION AT SIOUX FALLS

SIOUX FALLS, S. Dak., May 4.—Service station prices of gasoline were reduced 1½ cents to 23 cents by independent dealers in Sioux Falls Tuesday. Stations of the Standard Oil Co. of Indiana late Tuesday continued to sell at 24½ cents. The reduction follows increases by the Standard Oil Co. in the last two weeks which have amounted to 3½ cents.

CRUDE OIL PRICES

(Continued from Page 191)

Penna Grade Oil in Buckeye Pipe Line Lines (Ohio)	3.30
Cabell Grade Oil in Eureka Pipe Line Lines (West Virginia)	2.20
Corning Grade Oil in Buckeye Pipe Line Lines (Ohio)	2.35
Somerset Medium Oil in Cumberland Pipe Line Lines (Kentucky)	2.30
Somerset Light Oil in Cumberland Pipe Line Lines (Kentucky)	2.45
Ragland Grade Oil in Cumberland Pipe Line Lines (Kentucky)	1.15
Gaines (Pennsylvania)	3.10
Keister (Pennsylvania)	2.45
MIDDLE WESTERN STATES	
Ohio Oil Co.	
Lima	$2.23
Wooster	2.35
Illinois	2.12
Indiana	2.00
Princeton	2.12
Plymouth	1.65
Waterloo	1.10
*Western Kentucky, 32.9° and below	1.85
33° to 35.9°	1.95
36° to 38.9°	2.05
39° and above	2.15
**Cumberland, Barren and Monroe Counties	2.45
†Oil Springs (Canada)	2.70
†Petrolia (Canada)	2.63

*Posted by Indian Refining Co.
**Posted by Paragon Development Co.
†Posted by Imperial Oil Co., Ltd.

MEXICAN

*Tuxpam light (f.o.b. Mex. ports)	$1.35
§Panuco heavy (f.o.b. Mex. ports)	1.15
Tuxpam (New York)	2.05
Panuco (New York)	1.70

*Plus 30.33c tax. §16.93c tax.

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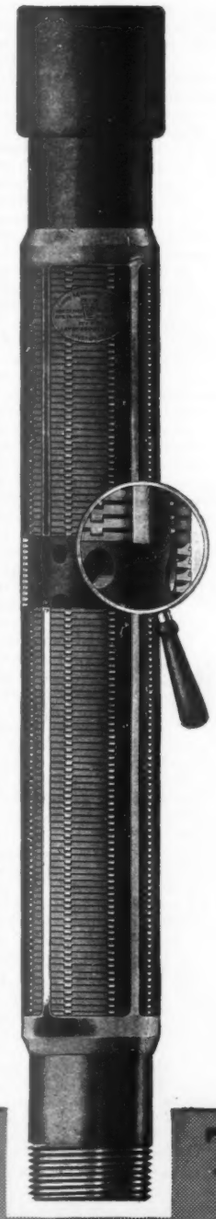

The Layne Screen will not Sand-jam or clog

Due to the keystone shape of the wire with which the Layne Screen is wound (narrow side next to the perforated pipe) the space between the wire is wider next to the pipe than at the outer surface of the screen. This provides a roomy passage through which anything entering the narrow outer opening will flow without possibility of sand-jamming.

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Oil Specifications in Relation to Use

Washington Discussing Revision of Motor Fuel and Lubricant Tests to Be Based on Engine Performance

By Charles E. Kern
Washington Bureau, The Oil and Gas Journal

WASHINGTON, D. C., May 3.—The oil industry, in the opinion of many scientific investigators devoting their time to petroleum technology, should realize that the time has arrived when empirical tests for the quality of petroleum products will be supplanted as rapidly as may be by rational tests which do indicate the service values of the products.

While the present tests are not wholly satisfactory they have served a useful purpose as a basis for buying and selling. They are in fact the foundations on which the present industry is built. There must be some basis for purchase and sale and it is not to be expected that these foundations can be ripped out until they can be replaced by better ones. To destroy them before there is something better to take their places would be as unreasonable as would be the ripping out of old foundations to a house before plans for new and better ones have been completed.

There are evidences that some oil companies, especially those fully established in the trade, regard these tests to determine value as unnecessary, believing that their experience permits them to produce a product satisfactory for the purposes for which it is offered to the public. Whatever may be the trend of thought of people in the industry respecting these contentions, it is quite evident that an issue is presented that will have to be settled one way or the other.

This change will not take place, it is believed, as the result of a dictum coming from the laboratory or from a society but it will be by a gradual recognition of advantages to be gained from rational tests. It must necessarily be gradual and consequently all ideas on the subject that may be entertained by those interested will prove of value in bringing about a proper solution of these problems so that the total thought of the industry will be obtained to bring about rational tests that are looked upon by many technologists as bound to come.

Specifications and Use

It is regarded as significant that at the present time consideration is being given to the relation of specification tests to the practical utilization of petroleum products. The tests in use at present have grown up with the industry as a convenient basis for purchase and sale but it is realized that these tests do not in all instances give valuable information regarding the service properties of the products.

The question as to the meaning of the present generally accepted tests is one in which there is considerable difference of opinion and it would hardly be proper to attempt in an article of this nature to discuss theoretically the significance of such tests. However, the present interest in the interpretation of tests and the differences of opinion regarding the significance of tests indicates that the present condition will not continue to exist for very many years.

It has been shown and generally recognized that specific gravity, as ordinarily used, means little. Gravity may be a valuable basis for purchase when applied to a known type of product, as for instance, in the purchase of crude from a given pool. However, if a finished product which may result from a blend of various crudes is tested it is evident that the gravity readings may be decidedly misleading and as a matter of fact, gravity has not appeared in the government specifications for lubricants and liquid fuels for many years.

A good many years ago it was realized that gravity was not a reasonable test for volatility and the present Engler distillation test was standardized by the American Society for Testing Material. (subcommittee D-2), and has come into quite general use as a basis for the purchase and sale of motor fuel. It is, however, now becoming apparent that even this test does not tell the whole story of fuel volatility because the conditions of evaporation in the engine are very different from that prevailing in the test.

Engine Performance

Considerable interest is being taken at present in rational methods of measuring volatility which will give results directly translatable into engine performance. Several such methods have been used in the labarotory but up to the present none has appeared to be simple enough for general routine use. It appears very desirable that such a simple rational volatility test should be developed.

In the beginning it was thought necessary to give the complete distillation curves of the fuel as indicated by the Engler test. Gradually the specification points have been reduced from the whole curve to four or five points on the curve and it now seems probable that only two points are of particular significance.

One of these points is near the initial and it is expected to give information regarding the properties of the fuel as regards starting the engine in cold weather.

The other point near the upper end of the curve will be indicative of the operating volatility of the fuel and will give information regarding probable crankcase dilution and complete utilization of the fuel. The rational volatility tests here referred to will of course consider only these two points, that is, starting and operating volatility. Experience will indicate the exact points which are to be chosen.

End Point's Purpose

The end point on the Engler distillation test has not been eliminated as yet. While it is probably without great significance and is difficult to measure exactly, due to unavoidable experimental error, it seems to some investigators that the elimination of this point might permit the inclusion of some undesirable compounds in the fuel.

The antiknock value of a fuel increases with increased amounts of unsaturated naphthenic and aromatic compounds in a fuel for a given distillation range or volatility and the gravity (A.P.I.) decreases with increasing amounts of unsaturated, naphthene or aromatic compounds. Since these compounds are the ones which may naturally occur in gasolines, especially in so-called antiknock gasolines, it is evident that insistence upon high gravity (A.P.I.) and at the same time insistence upon given volatility as defined by the distillation test, may limit the antiknock value of the fuel.

The inadvisability of the specifications of specific gravity is evident, it is also evident that gravity has no definite relation to volatility except for a particular class of compounds. For instance, for straight run paraffin gasoline the gravity would increase with increasing volatility. However, a gosoline containing appreciable amounts of naphthenic compounds which are very desirable from the standpoint of antiknock would appear from the gravity test to have good volatility when compared with a straight paraffin fuel, when as a matter of fact it may be more volatile than the paraffin fuel of the same gravity, and would have decidedly better antiknock characteristics. It appears then that the use of gravity as a basis of purchase without regard to the nature of the compounds in the gasoline may be seriously detrimental.

We are beginning to realize the importance of the antidetonating, or antiknock, properties of our motor fuels. Considerable research and practical work has been done to the end that suitable fuels for present engines and for future engines, which may be of much higher compression ratios, may be available. The advantage of the high compression engines is that considerably greater mileage can be obtained from the same amount of fuel.

Antiknock Properties

Antiknock properties can be obtained by utilizing compounds which naturally occur in gasoline and which occur in much greater proportions in cracked gasoline. These compounds unsaturated, naphthenic and aromatic, have been associated in the present state of the art with poor color, instability, loss of color in storage, bad odor and a tendency toward gum formation in the engine.

In view of the presence of antiknock constitutents in off-color gasolines this off-color has been capitalized and in some localities the off-color gasoline sells at a premium. It must be realized that instability and tendency to form gum, are in themselves objectionable and should be reduced so far as is consistent with the retention of desirable antiknock characteristics. The present tests for stability and gum formation do not seem to be adequate to define the service characteristic of cracked fuels, and much work is needed and is now in progress regarding suitable tests.

The production of suitable antiknock gasoline by cracking processes will necessarily consist in a compromise from both sides representing the interests involved. The refiner probably can go far towards improving color stability and tendency to gum and the user may come to recognize that he cannot consistently demand antiknock properties and the same stability and color that was easy to obtain with the straight run gasoline.

Antiknock properties can also be secured by the use of chemicals which act in catalytic manner; that is, the effect produced seems out of all proportion to the small quantity of the substance employed. There are of course problems connected with the use of such antiknock compounds which will be solved as with the cracked gasoline by cooperation between producer and user.

Lubricating Oils

The facts relating to viscosity of lubricating oils show up very much better than do the foregoing, in that it does appear that viscosity is a rational measure of service performance.

The question of the significance of organic acidity in lubricating oils is very much in question. In fact such acidity is supposed by some to be definitely valuable and desirable.

The interpretation of a carbon residue test as affecting the formation of carbon in the combustion chamber has received considerable attention but no definite conclusion can yet be stated.

The pour point which was originally designed to indicate whether the lubricating oil would flow readily from shipping containers in cold weather, was applied to motor oils with the expectation that such tests would indicate the performance of the oil in a cold crankcase. It is generally believed that the relatively high pour point of the paraffin base oils are due to a skeleton of wax crystals which

FACILITIES FOR OIL BUNKERING IN GALVESTON-HOUSTON DISTRICT

By Charles E. Kern

WASHINGTON, D. C., May 1.—During the last calendar year according to figures just compiled by the Department of Commerce, the exports of all petroleum products from Galveston, Tex., amounted to 391,044,735 gallons, or about 1,348,000 tons. This compares with shipments from Sabine of about 1,643,000 tons.

The Galveston exports of petroleum during 1925 were made up of the following classes: Crude petroleum, 75,072,410; gasoline, naphtha, etc., 4,959,334; kerosene, 37,058,569; gas and fuel oil, 174,692,305; red and pale lubricating oil, 22,788,621; black lubricating oil, 7,224,426; cylinder lubricating oil, 845,443; residuum, 2,403,627, all of which amounts for classes of oil being expressed in gallons.

The city of Galveston was one of the marvels of engineering skill, and was given additional importance by army engineers who constructed the ship canal connecting that port with Houston. The Galveston entrance has a lease depth of 32 feet in a channel 800 feet wide. Galveston Bay is about 30 miles long and 17 miles wide at its widest part, with a depth of only 7 to 9 feet. Galveston Harbor is the name generally applied to the entrance and southern part of Galveston Bay. It is about 345 miles west of the mouth of the Mississippi River and 280 miles from the Rio Grande. The city of Galveston covers the entire width of the island, the south side of the city fronting upon the Gulf of Mexico from which it is protected by a concrete wall 17 feet high.

The most recent water front improvements include the construction of a wharf by the Gulf Refining Co. and a pier by the Mexican Petroleum Corp. These two improvements testify to the increasing importance of Galveston as a place for the export of oil and for the supply of bunker oil.

Facilities for oil bunkering are available at several points along the water front, and vessels may also be bunkered by barge while at piers. There are six companies furnishing fuel oil at the port. These are the Magnolia Petroleum Co., Gulf Refining Co., Rio Bravo Oil Co., The Texas Company, Mexican Petroleum Corp., and the National Oil & Transport Co.

The Magnolia Petroleum Co. has three storage tanks located in the rear of Pier 41, with an 8-inch pipe line running on Piers 39 and 40. These tanks have a storage capacity of 93,000 bbls. with a bunking capacity of 1,500 bbls. per hour.

The Gulf Refining Co. maintains its own plant at Pier 5 and at the east end of the water front. This company has eight steel tanks with storage capacity of 250,000 bbls. Vessels are bunkered at the pier at the rate of 1,200 bbls. per hour. This company also has one towed barge with a carrying capacity of 600 bbls. which bunkers at the rate of 200 bbls. per hour.

The Rio Grande Bravo Oil Co. is located at Piers B and C of the Southern Pacific Terminal Co., at Forty-fifth Street. It has a storage capacity of 440,000 bbls.,

(Continued on Page 204)

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while very delicate, is not broken down under the conditions of the accepted tests.

Work on the flow of oils at low temperature under driving pressures comparable with those obtained with forced feed lubrication indicates that the pour point is not a satisfactory criterion for low temperature lubrication. It may be that an oil having a pour point of 40 degrees (Fahrenheit) higher than that of another oil may flow more freely in the engine at a given low temperature than the low pour test oil. There appears to be a pressing need for some satisfactory method of measuring fluidity at low temperatures and some work tending toward the substitution of low temperature flow tests for the pour tests is in progress.

Color as applied to oils produced from a known crude and by known processes of refining has considerable significance to the technical man who is accustomed to associate color with crude and refining methods. However, color of itself as applied without regard to crude and methods of refining may be absolutely misleading and this fact is now generally recognized. Where color specifications are incorporated they are understood to apply to a definite type of oil and the specifications are usually so drawn as to permit of very wide variations.

It is realized that if the foregoing conditions that pertain to efforts to fix a basis for the purchase and sale of petroleum and its products are understood, the industry will be better able to lend assistance in bringing about improved methods, which are now problematical but which must eventually come about practically by common consent.

BUNKERING FACILITIES IN GULF COAST AREA

(Continued from Page 202)

with a bunkering capacity of 800 bbls. per hour.

The Texas Company has one 10-inch and one 8-inch pipe line on Pier C of the Southern Pacific Terminal Co. This company has a storage capacity of 109,086 bbls., with a bunkering capacity of 600 bbls. per hour.

The Mexican Petroleum Corp. is located at Fourth Street and Avenue A. In addition to a modern pier and storage plant at this site this company also has a 10-inch pipe line at Pier 41. There are six steel tanks with a storage capacity of 330,000 bbls., with a bunkering capacity of 4,000 bbls. per hour.

The National Oil Co. has a 14-inch pipe line at Pier A of the Southern Pacific Terminal Co. This company has three steel tanks with a storage capacity of 165,000 bbls., bunkering at the rate of 4,000 bbls. per hour.

Of the 31 wharves at the Port of Galveston with a depth of water ranging from 12 to 30 feet at mean low water 4 are used for handling fuel oil.

The Port of Galveston is served by five railroads, the Galveston, Houston & Henderson Railroad, the Gulf, Colorado and Santa Fe Railway, the International Great Northern Railroad, the Missouri, Kansas, Texas Railroad of Texas and the Southern Pacific Co. Texas Lines .

Exceeded Oil Imports

During the period from 1912 to 1921, petroleum and its products exceeded in volume all other commodities imported at Galveston. The average annual amount received during that period being 588,640 tons, or 79.7 per cent of the total imports.

Of the domestic shipments from the port for the 10-year period, petroleum products constituted 22.2 per cent.

The most important commodity imported at the Ports of Galveston, Houston and Texas City all linked togther, and contributing to the general traffic, is crude oil from Mexico. The greater portion of this oil is moved by rail, and is forwarded to refineries in the State of Texas.

Houston has 11 companies furnishing fuel oil either at the port or along the ship channel. These are the Houston Oil Terminal, Deepwater Oil Refinery, Magnolia Petroleum Co., Rio Bravo Oil Co., The Texas Company, Sinclair Refining Co. of Maine, Humble Oil & Refining Co., Crown Central Petroleum Corp., American Petroleum Co. and Galena Signal Oil Co., the Gulf Pipe Line Co., and the Clarion Oil Co.

The Houston oil terminal is located on the south side of the turning basin, with pipe lines on the municipal wharves. This company has three steel tanks with a total storage capacity of 114,000 bbls. and a bunkering capacity of 3,000 bbls. per hour. It also operates five tow barges, with a total carrying capacity of 16,350 bbls., capable of bunkering from 750 to 1,000 bbls. per hour.

The Deepwater Oil Refinery and the Magnolia Petroleum Co. are both located at Manchester, 2 miles below the turning basin. The former has three steel tanks with a total storage capacity of 165,000 bbls. Vessels are bunkered from pipe lines on the Manchester Wharf.

The Magnolia Petroleum Co. has two steel tanks with a total storage capacity of 110,000 bbls. and a bunkering capacity of 5,000 bbls. per hour. The wharf of this company is used for barge traffic.

The Rio Bravo Oil Co. and The Texas Company are located at Clinton, 3 and 4 miles, respectively, below the turning basin. The Rio Bravo Oil Co. has a storage capacity of 55,000 bbls. and a bunkering capacity of 2,000 bbls. per hour.

The Texas Company has four steel tanks with a total storage capacity of 126,600 bbls. and a bunkering capacity of 500 bbls. per hour.

The Sinclair Refining Co. of Maine has a wharf at Sinco, with steel tanks having a total storage capacity of 100,000 bbls., and a bunkering capacity of 1,000 bbls. per hour. This company operates three towed barges of 7,300, 8,500 and 15,000 bbls. carrying capacity, capable of bunkering at the rate of 1,000 bbls. per hour.

Baytown Wharves

The Humble Oil & Refining Co. wharves are located at the Baytown refinery at Webster. It has 85 steel tanks with a total storage capacity of 4,657,000 bbls. Vessels are bunkered at the wharves at the rate of 15,000 bbls. per hour. This company also has 11 steel tanks at Houston with a total storage capacity of 450,000 bbls. and a bunkering capacity of 12,000 bbls. per hour. There are four towed barges with a carrying capacity of 2,000 bbls. each, capable of bunkering at the rate of 1,000 bbls. per hour.

The Crown Central Petroleum Corp., located at Pasadena, has two steel tanks with a total storage capacity of 150,000 bbls. Vessels are bunkered at its wharf at the rate of 1,500 bbls. per hour.

The American Petroleum Co. and Galena Signal Oil Co. have 60 steel tanks with a total storage capacity of 3,300,000 bbls., and a bunkering capacity of 15,000 bbls. per hour. These companies also operate two towed barges, with a carrying capacity of 18,000 bbls., capable of bunkering at the rate of 2,500 bbls. per hour.

The Gulf Pipe Line Co. is located at Lunchberg, 16 miles below the turning basin. It has eight steel tanks with a total storage capacity of 700,000 bbls. Vessels are bunkered at the wharf at the rate of 8,000 bbls. per hour.

The Clarion Oil Co. has a wharf at Clinton, with three steel tanks, having a total storage capacity of 160,000 bbls. Vessels are bunkered at the wharf at the rate of 4,000 bbls. per hour.

Houston furnishes a notworthy example of a successful port at an inland point originally inaccessible to ocean vessels.

Port of Texas City

The Port of Texas City, Tex., is also well equipped for fuel oil bunkering with an oil wharf, pipe lines and pumping stations for discharging tanker boats and for loading and bunkering purposes. There are two companies furnishing fuel oil at the port, the Pierce Oil Corp. and Swiftsure Petroleum Co.

The Pierce Oil Corp. with an oil wharf located at the south end of Texas City above Pier E, has a storage capacity of 450,000 bbls. Bunkering is done at the rate of 3,000 bbls. per hour.

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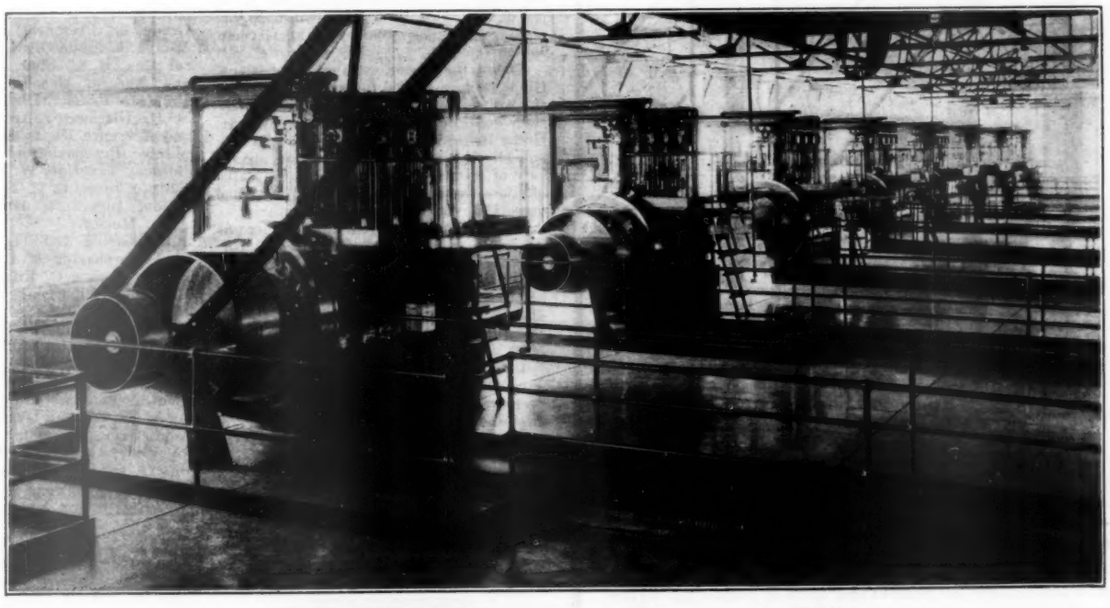

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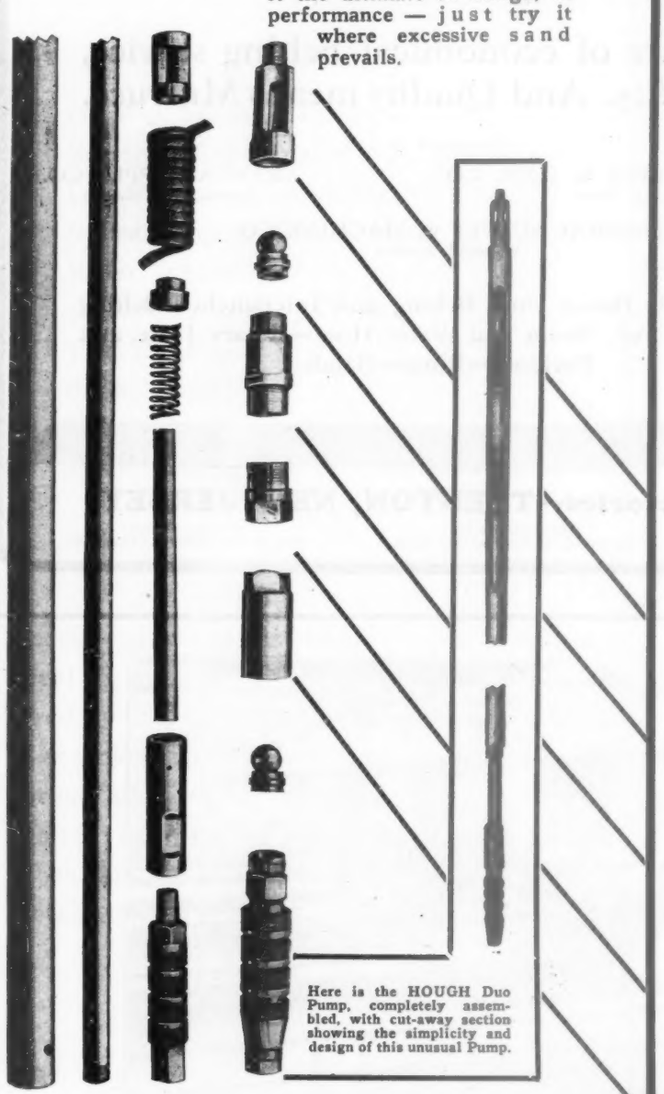

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lines on Pier B. The total storage capacity of the company is 330,000 bbls. Bunkering is done at the rate of 2,000 bbls. per hour.

The Humble Oil & Refining Co. does not do a commercial bunkering business, but bunkers its own boats.

The ports of Galveston, Houston and Texas City enjoy import and export class rates to and from points north of the Ohio River and extending as far east as Cincinnati which are on the same basis as the rates applying through New Orleans and Mobile. From a rate viewpoint, therefore, each of these ports has opportunity for the development of through import and export business. The movement of traffic through these ports from interior points is not influenced by the rate alone, but more particularly by the facilities available at the port for the handling and accommodation of traffic, the vessel lines operating to and from the port and other factors connected with the conduct and financing of foreign trade.

OIL COMPANIES DENIED U-BOAT LOSS CLAIMS

By Charles E. Kern
Washington Bureau
The Oil and Gas Journal

WASHINGTON, D. C., May 1.—The Mixed Claims Commission, United States and Germany, has denied to the Standard Oil Co. of New York, the Sun Oil Co. and the Pierce Oil Corp. their claims against Germany, aggregating $4,576,832 as compensation for the loss of seven tank steamers sunk by German submarines during the war. Judge Edwin B. Parker ruled that Germany was not obligated to pay compensation in this case.

These seven tankers had been requisitioned by Great Britain and were operating under the British flag. The owners had been paid $6,030,668 by the British Government, but they claimed the difference between this amount and the alleged value of the tankers, namely, $10,607,500.

The Standard claimed $1,980,322, the Sun Company $1,782,020 and the Pierce Oil Corp. $814,480 as balances due them for damages which they sustained in the sinking of tanker steamships by German submarines.

Under the terms of the requisitions, Great Britain agreed to pay to the owners the value of the tankers at the time of their loss if lost through risks of war. Great Britain did in fact pay the British subsidiaries of the claimants an aggregate of $6,030,668, representing the value of these seven tankers as requisitioned vessels at the time of their loss.

The claimants, in their capacity as American stockholders of the British corporations owning these tankers, sought here to recover the difference between the amounts paid by Great Britain and the alleged value of the seven tankers as free ships in a free market, namely, $10,607,500.

In this case the umpire held that presumably the claimants derived and expected to derive advantage from the British ownership and the British registry of these ships. He said they confused damages which subsidiaries sustained as a result of Great Britain's act in requisitioning their ships and the damages of such subsidiaries sustained by Germany's act in destroying their ships. Germany was not obligated to compensate the American complainant for the losses complained of and the claims were dismissed.

ROYALITE OIL REPORT

At the fifth annual meeting of the Royalite Oil Co., operating in the Turner Valley Field, held at Calgary, the financial reports indicated that the operations of the company had resulted in a net profit for the 12 months ending December 31, 1925, of $335,754.47. No dividend was paid, as the surplus earnings are being used to carry out the development work on the Dalhousie Oil Co. holdings. The controlling 51 per cent interest of Imperial Oil, Ltd., in the Dalhousie Oil Co. has been transferred to the Royalite Oil Co. The following officers were elected by the Royalite Oil Co.: Chairman of the board, A. M. McQueen; president, R. B. Bennett; vice president, Tronson Draper; secretary treasurer, Miss F. M. Smith; directors, Messrs. McQueen, Bennett, Draper, A. E. Cross, William Pearce and C. M. Moore. Dalhousie No. 6 well will be started in the Turner Valley Field. The Royalite Oil Co., not Imperial Oil, Ltd., owns the pipe line from the Turner Valley to the Imperial refinery at Calgary.

OIL AND GAS LECTURE COURSE TO CONTINUE

Starting last year under the auspices of a few oil leaders for the benefit of oil company employes who wished to learn more about the various departments of an oil organization, the oil and gas lectures at the Tulsa Central High School will be resumed next November. The classes are held Tuesdays and Thursdays of each week.

There are 36 lectures by leaders of the oil industry scheduled for the 1926-1927 term. Enrollment for the past year averaged 150 students at each biweekly meeting. The 1926-27 course is as follows:

S. H. Glassmire, leader in charge.

Introductory: History of the Petroleum Industry, C. C. Herndon; The Industry in the Southwest, Pat Malloy; Oil Economics, W. C. Franklin; Evolution of the Oil and Gas Lease, James A. Veasey; Oil Fields of the Mid-Continent, George Foster; Oil Fields of the Texas Panhandle, M. M. Valerius; Petroleum Geology, Harry F. Wright; Oil Sands, Luther White.

Executive Department Organization, P. J. Hurley; Engineering, Scouting and Lease Brokers, C. D. Watson and George H. Lang; Incorporation and Litigation, Judge Summers Hardy; Legal Department, Bond Titles, N. A. Gibson; The Oil and Gas Lease (Mid-Co. 88), Rush Greenslade; Legal Department Lease Titles, Herbert D. Mason; Oil and Gas Leases, Judge Summers Hardy; Decisions, B. W. Griffith; Rentals and Royalties, S. H. Glassmire; Production of Oil, R. F. MacArthur; Production by Flooding Processes, Burt Collins; Recovery of Crude by Pressure, James O. Lewis; Mining of Crude Oil, Leo Ranney; Natural Gas, R. C. Sharp; Casinghead Gas and Natural Gasoline; Emby Kayne; Problems Presented by the Garber Field, S. H. Glassmire; Accounting, Auditing and Treasure Departments, H. G. Humphreys; Purchasing and Materials, O. V. Borden; Taxation, W. A. W. Krebs; Liability, Claims, C. C. Deardorff; Compensation, Insurance, Hunter Martin and A. L. Morley.

Purchasing and Transporting Companies—Purchasing of Crude, Grades and Prices, Horace C. Fitzpatrick and J. E. Emersons; Pipe Lines and Common Carriers, John R. Manion and B. F. Sibols.

Refining Companies—Refining of Crude Oil, D. W. Moffit; Refining Processes and By-Products, Dr. C. K. Francis.

Marketing Companies — Sales Department, Jobbing and Marketing, F. W. Burford; Traffic and Transportation, A. F. Winn; Gasoline and Filling Stations, E. H. Wiet; Conclusion, Future of the Industry, C. J. Wrightsman.

SOMERSET PIPE LINE RUNS

SAN ANTONIO, Tex., May 1.—Pipe line runs from the Somerset Field in Bexar County for March totaled 65,975 bbls. or a daily average of 2,131. Daily average for the 28 days of February was 2,283 and for the 31 days of January 2,097. January's daily average was the lowest the field has had in years and the gains in February and March are due to several companies doing some new drilling which is adding a little flush production, as well as new wells. With the drilling now under way the production during the summer will hold fairly steady and is not likely to drop below 2,000 bbls. per day. The oil is high gravity and gets Mid-Continent prices, and any further increase in crude prices will stimulate drilling. There is a great deal of proven but undrilled acreage in the field.

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EFFECT OF CLOSING IN PRODUCTION DEMONSTRATED IN COALINGA FIELD

By V. H. Wilhelm*

The attention of oil operators has been directed to the question of migration of oil to neighboring operating and competing areas from areas which have undergone, or may have to undergo, prolonged inactivity owing to unfavorable market conditions or other reasons. This question is of much importance, as the difference between profitable and unprofitable operation depends upon the correct interpretation of the data furnished by many "shut-down" areas.

The question is economic and involves many factors, the more important being the cost of storage, pipe lines, real estate and rights of way, interest on capital invested, and loss by evaporation and leakage. Offsetting these considerations are the possible, but unknown, losses by migration or drainage to neighboring and competing producing areas, which might result if underground storage were resorted to.

The following data and conclusions show that "shut-in" production in fields, such as the Coalinga Field, is merely deferred production, a considerable proportion of which is recovered in the first few months after production is resumed, and without considerable migration to neighboring pumping wells. The conclusions drawn are not to be considered as applicable to fields of high pressure gas where gas is the predominating factor in the recovery of oil.

Cost of Storing Oil Above Ground

The storage of oil above ground is expensive for several reasons. Evaporation is a large factor, especially in the San Joaquin Valley during the hot dry summer months. Evaporation losses naturally vary with the type of storage used and the gravity of the oil. The minimum loss by evaporation for 26 gravity oil in the best type of sealed steel tanks in the Coalinga Field is 3 per cent a year. Evaporation losses on 12-15 gravity oil is considerably less.* In large earthen storage shrinkage of 26 gravity oil is as high as 14 per cent a year.

The cost of storage would naturally have to be charged off to the first cost of the oil, as there is no assurance that the tanks will be used a second time. The minimum cost of complete installation of earthen storage of large capacity is 35 cents a barrel. The best types of large steel tanks cost 60 cents a barrel. A large portion of the oil now in storage was placed in tanks during 1922 and 1923, during a period of great overproduction. Including the cost of storage and pipe lines, this oil represents a minimum outlay of $1.20 a barrel.

Maintaining this oil in storage is a considerable and constant expense. Adding taxes, interest on investment, evaporation losses, fire insurance and maintenance, the cost of storing oil would be not less than 20 cents a barrel a year. Oil in storage at present may not be disposed of at a profit for many years, as the cost of storage will probably be greater than the possible increment in market price due to shortage in production. Thus it can be seen that above-ground storage of oil represents both a material and economic loss. Underground storage is the ideal method of storing oil, and should be resorted to when conditions are favorable.

Structure and Operations

The Coalinga Field is separated into two structures; the eastward dipping monocline of the west side field, and the gently plunging anticline of the east side field, the east flank of which extends as a monocline to the north.

Much of the west side field is divided into small properties, while the east side field is held almost entirely in large tracts. The small properties of the west side have generally continued to operate under all adverse conditions, while the large companies during periods of overproduction have resorted to shutting down their producing wells and storing the oil in its natural reservoir, awaiting more favorable conditions before producing. During the periods of depression some areas were operated while contiguous areas of competing companies were shut down, and the question of loss by drainage, from the inactive area to the active area, was immediately brought forward for solution.

The question then which demands a reasonable answer is whether an operator may safely shut down his property with a fair chance of ultimately recovering the same, or nearly the same, amount of production as would have been recovered by continuous operation, and if the loss in production, if any, will be of enough consequence to warrant the construction of storage facilities for it during periods of an unreceptive market.

Theory of Migration

The relative importance of the several factors governing the migration of underground oil are not well known in fields of low gas pressure such as Coalinga. Among these factors are force of gravity, viscosity and hydrostatic pressure of edgewater. The texture or porosity of reservoir sands, and gas pressure to a slight extent, also have an important bearing on the question.

In the Coalinga Field, where casinghead pressure seldom reaches two pounds, influence of gas pressure is considered negligible. The casinghead pressure should be a direct index of the action of gas as an expulsive agent. Many wells in the east side field register no pressure at the casinghead, even after being closed in.

Although in the early stage of development of the Coalinga Field a very high gas pressure existed, it has long since been depleted. Therefore, accumulation of heads of high gas pressure in oil-bearing strata underlying nonproducing areas could not occur, and likewise migration of oil, with gas seeking a vent, would not take place.

Gravity

If it is assumed that the oil sands are of uniform texture and porosity, and at the same time continuous over large areas, oil would be expected to migrate, under the force of gravity, to the deeper seated reservoirs. That is to say, the oil would tend to seek a uniform level over the entire structure within which it was confined. This action would certainly cause the flow of oil from nonproducing areas lower down on the structure. The tendency would be to resaturate deep territory at the expense of the shallower territory.

However, the oil-bearing sands of the Coalinga Field are neither uniform in character nor continuous over large areas. Correlation of well logs and the character of the surface formations give ample proof of this.

Gravity should readjust fluid levels within areas of the same sand texture and in which the same beds are continuous. The migration of oil by gravity is necessarily slow, and depends to a considerable extent on the viscosity and A. P.I. gravity of the oil and the porosity of the sands. During periods of production the fluid levels of wells are naturally lowered. After the wells have been shut in for some time the fluid levels tend to become higher, and approach in some instances the fluid levels of the wells when first placed on production. Observations of fluid levels in Sections 26 and 27, T. 19s., R. 15e., M. D. B. and M., before and after shut-in periods confirm the above statements. Due to this slow action of gravity, each individual well drains but a comparatively small area in close proximity to the hole.

Edgewater

The action of edgewater rising along a line roughly parallel to the strike of the structure, to replace oil as it is removed from its natural reservoir, is one of the forces influencing the drainage of oil from the sands and acts in opposition to the force of gravity.

Under certain conditions the encroachment of edgewater would result in unrecoverable loss of production following

*Deputy supervisor, District No. 5, California State Mining Bureau.

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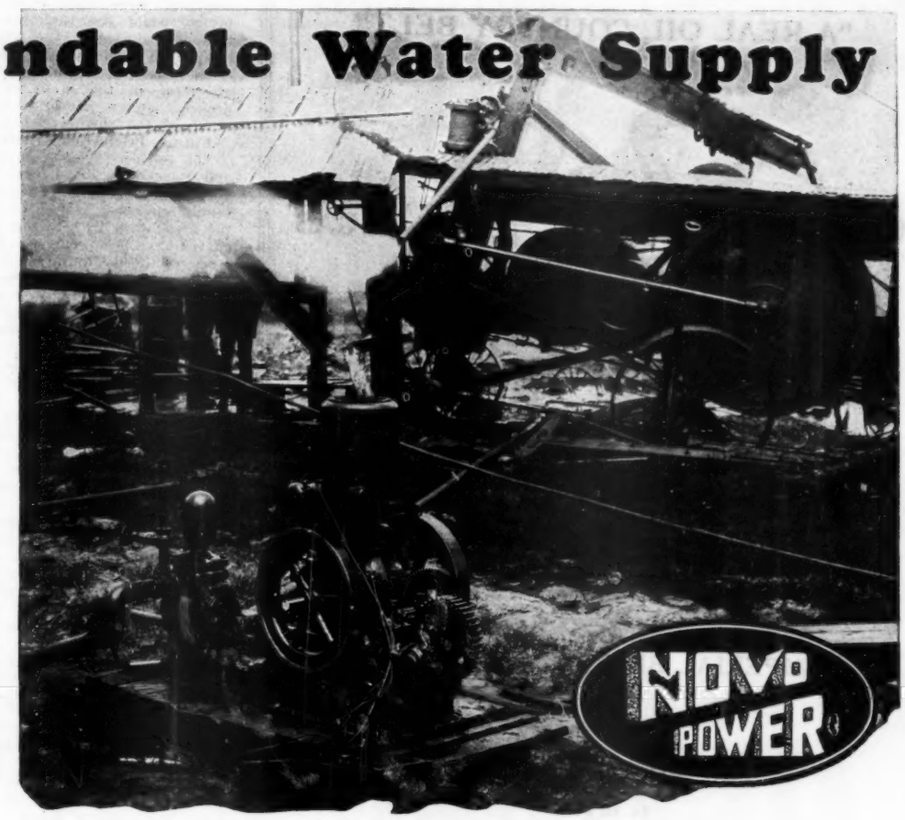

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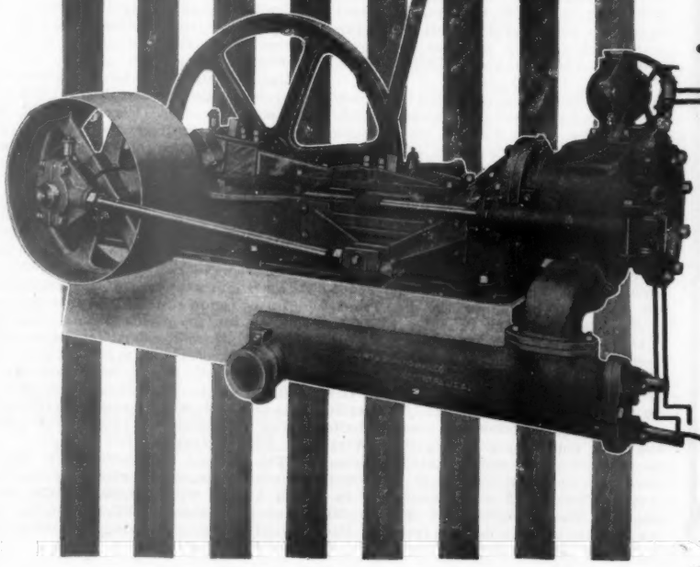

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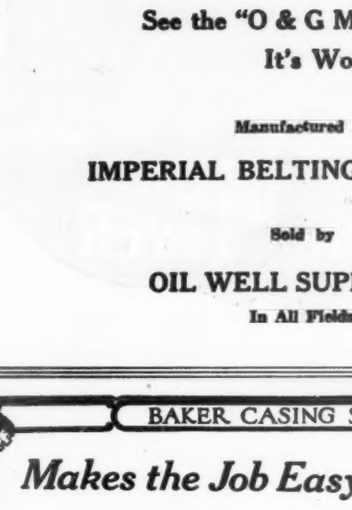

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a shut down. If, for example, the deeper of two properties, one above the other on the structure, the deeper being edge territory, were shut down for a long period while the shallower were continuously operated, the gradual depletion of oil sands common to both properties would result in the encroachment of water in the sands of the deeper property and a migration of oil to the sands of the shallower property.

Future Production—Decline Curves

The estimates of future production and the production figures representing normal production have been based upon family curves prepared particularly for the areas dealt with in this paper. These curves have been constructed by detailed study of the decline of many representative wells of each area where the accumulation of oil is supposed to have taken place under similar conditions, and where the physical character, producing horizon, and water conditions are similar.

The principle involved is that of the "law of equal expectations," which may be stated as follows:

"If two wells under similar conditions produce equal amounts during any given year, the amounts they will produce thereafter, on the average, will be approximately equal, regardless of their relative ages."

According to this law the production of any well of a group having similar producing conditions will decline at a rate applicable to all members of the group. The curve representing the rate of decline of any member of the group will have the same form as the curve for any other member.

In this paper the figures for production during shut-down periods, and also for post shut-down production, have been estimated by the use of these curves. These estimates should represent as close an approximation as is possible for such an investigation.

The first opportunity for observing the effect of closing in production in the East Side Coaling Field was presented during the labor strike of 1921.

The producing properties of Standard Oil Co. and Shell Co. of California were not affected by the strike, while all the wells of Pacific Oil Co. were shut down for a period of about eight weeks.

A close study of the production records of these properties fails to disclose any gain in favor of either Standard Oil Co. or Shell Co. of California line wells, and, moreover, indicates that a large proportion of the production lost by Pacific Oil Co. during the strike was recovered within a relatively short time after operations were resumed. An exception to this rule was noted in the wells along the line between Section 11 and 14, where a slight gain is shown in the wells of Shell Co. of California during the strike and a slight decline in wells of Pacific Oil Co. after the strike.

Producton Curves

A comparison of production of Sections 26 and 35, T. 19s., R. 15e., M. D. B. and M., Coalinga Field, commences January, 1920, and extends to October, 1925, and includes a period of 18 months of maximum production for both sections, from January, 1920, to and including June, 1921.

Section 35 was not subjected to periods of shut-down followed by short periods of maximum production as was Section 26, except that during part of September, all of October, and part of November, 1921, it was entirely shut down during the labor strike.

The same wells on both sections were used throughout the investigation. No new wells were completed during this period of the curves. The decline for both sections was uniform and at about the same rate prior to the first shut-down, which occurred in July, 1921.

During June, 1921, the production of Section 26 was reduced to about 82,500 units a month (one unit equals X barrels of oil) by shutting down 16 wells of the 29 producing on June 1, 1921. The wells which continued producing include both the first and second line wells. With Section 26 producing in this condition during the ensuing months of July and August, Section 35 was operated to capacity. The production of Section 35 was not increased; on the contrary the uniform decline continued, declining from 152,500 units in June, 1921, to 135,000 units in August, 1921.

Thus it appears that Section 26 suffered no loss on account of the reduction in the number of pumping wells; and likewise, that Section 35 obtained no part of its excess production from Section 26.

During September, 1921, all of Section 35 was shut down owing to labor troubles. The 13 wells on Section 26, which had not been shut down in June, 1921, continued to pump throughout the whole time of the shut-down of Section 35, which lasted until the middle of November, 1921, a period of about eight weeks. During this period the production of Section 26 declined from 78,750 units per month to 73,750 units per month.

The conclusion that wells on Section 26 did not drain from Section 35 during the strike seems as well founded in this case as in the other case cited above.

During November, 1921, at the termination of the strike, all wells on Section 35 were operated, and a very large flush production was obtained. If the decline had continued from August, 1921, without interruption, the production for December, 1921, should not have exceeded 125,000 units per month. After a shut-down of eight weeks the section produced 187,500 units in December, 1921, and in January, 1922, an excess of 62,500 units. The flush production declined sharply after two months to 150,000 units and this production was maintained, with but little further decline, until the section was shut down in August, 1922.

Production Unaffected

During the eight months following the strike, Section 35 produced 1,285,000 units of oil, which was about 265,000 units over the normal production for that period had there been no strike and consequent shut-down. According to the normal decline for the section the lost production during the strike amounted to about 225,000 units. It appears then that for this section not only was the entire loss of 225,000 units recovered in eight months, but an excess of 40,000 units was produced. Nevertheless, the production of Section 26 during this period remained unaffected, except that when opened up for short periods in February and May, 1922, the flush production obtained was not as great as on Section 35.

The production of Section 35 declined sharply in February, 1922, when Section 26 was operated. It cannot be said whether this decline of 37,500 units per month was due to the opening up of Section 26 or to the reduction of the accumulated head of oil on Section 35. The fact that during the following month (March, 1922) Section 35 showed a gain of nearly 17,500 units indicates that the latter was the case.

Finally, during June, 1922, Section 26 was again shut down, this time to 35,000 units a month. During June and July, 1922, the production of Section 35 remained unchanged, again indicating that no drainage from section to section occurred during the short period of shut-in production.

During July, 1922, both sections were shut down again to less than 50,000 units per motnh, and in December, 1922, Section 26 was entirely shut down. This period lasted until February, 1924, during which Section 35 produced steadily at about 50,000 units per month.

In March, 1924, both sections were operated to maximum capacity. Section 35 came back with a large flush production, nearly reaching the peak of 1920. This production of between 150,000 and 187,500 units a month was maintained down to October, 1925. The normal production for the period commencing February, 1924, and ending September, 1925, had there been no previous shut-down periods, could hardly have exceeded 2,100,000 units. The actual production for this period, however, was 3,275,000 units, which represents an excess over normal of 1,175,000 units.

The normal production for the 18 months commencing with August, 1922, and ending with January, 1924, would have been about 2,062,500 units. The actual production during this period was

775,000 units. This represents a loss of 1,278,500 units. Granting the approximate correctness of the decline curve used 90 per cent of the lost production during the period of shut down in 1922 and 1923 was recovered in 20 months following January, 1924.

In the meantime Section 26, although producing to maximum capacity during March and April, 1924, failed to produce the amount of flush production that was obtained on Section 35. Unfortunately, it then became necessary to shut down Section 26 and since that date only a few of the line wells have produced.

An analysis of the individual well production of Section 35 indicates that the inside wells had a larger percentage of flush production than the line wells. Had any of the flush production of Section 35 been obtained from the drainage of Section 26 it would seem that the wells on Section 35 nearest the Section 26 line would have produced a higher percentage of the flush production than the inside wells.

The general conclusion to be drawn from these curves is that no considerable loss will be sustained by shutting down one area while the other is operated, provided gas pressure and encroaching edgewater are not factors. The periods permitting comparisons in the cases cited have been relatively short, but the conclusion to be drawn is that it is reasonably safe to shut down wells of low gas pressure for at least these periods of time with little danger of loss.

A production curve for Section 10, which was entirely shut down in June, 1922, and not operated again until February, 1924, 21 months later, shows the loss during the shut-down period estimated at 562,000 units; 385,000 units of this loss has been regained in the period February, 1924, to September, 1925. It appears that the entire loss of 562,500 units may be recovered before the close of 1926.

Conclusions

An exhaustive analysis of the production reports of certain areas in the Coalinga Field of shut-down has resulted in the following conclusions as to the effects of closing in wells:

1. On opening up wells after a considerable period of shut-down, a flush production of oil is obtained which is due to the resaturation of the voids in the sands from which the well is producing. This flush production averages from 30 to 60 per cent above normal production.

2. As a rule the flush production of water is as great as that of the oil, although in many cases wells which normally produced all water, started off, when opened up, produced all oil. This is probably due to the fact that a gravitational separation of the undisturbed fluids in the sands allowed a head of oil to accumulate in the well, forcing the water back into formation.

3. The location of wells on the structure had no effect on the amount of flush production, except where water conditions were serious.

4. Many wells when opened up produced an increased amount of sand and were kept on production with difficulty.

5. The flush production obtained in edge territory, where water conditions were serious, was very small, and it is concluded that it is inadvisable to shut in wells in edge territory. In some cases it was indicated that there was a readjustment of the edgewater line during the shut-down, the line of encroachment tending to become a straight line. This would benefit certain wells located up-dip from the average line of edgewater.

6. The ultimate recoverable oil from the field has not been decreased by the shutting in of the wells. The life is merely prolonged, although a considerable amount of this deferred production is obtained soon after resumption of pumping.

INTERSTATE COMMERCE COMMISSION CASES

By Charles E. Kern

WASHINGTON, D. C., May 1.—The Interstate Commerce Commission has found unduly prejudicial and preferential the rate on gasoline in tank cars from Somerset, Tex., to Phoenix, Ariz., to the extent that it exceeded $1.26 per 100 pounds. This is the case of the Pioneer Oil & Refining Co. against the San Antonio Southern Railway Co. and others, in which the complainant was charged $1,445 for the transportation of 10 carloads of gasoline shipped between February 9 and 21, 1921, from Somerset, Tex., to Phoenix, Ariz.

In the case of the White Star Refining Co. vs. Atchinson, Topeka & Santa Fe Railway Co. and others, the Interstate Commerce Commission holds that shipment of lubricating oil and gasoline in carloads from Okmulgee, Ponca City, Cushing and Tulsa, Okla., and Independence and Augusta, Kans., to Detroit, Mich., have been overcharged. The commission finds that the rate .45 was applicable to complainant's shipments.

Under a report proposed by Examiner R. N. Trezise in the case of Shores-Mueller and others vs. A. T. & S. F. and others it is suggested that the commission should hold rates on fuel oil in tank carloads, from Kansas City and points in Oklahoma to Cedar Rapids, Des Moines and Waterloo, Iowa, during 1921 and 1922 to be unreasonable and unduly prejudicial to the extent that they exceeded 5 cents more than the contemporaneous rates on refined oil, in tank carloads, from and to the same points, which differential should be modified by the general percentage reduction of July 1, 1922, for shipments moving on and after that date; that reparation should be paid to the complainant and also to the Armstrong Manufacturing Co. and the Liberty Oil Co.

A proposed report prepared by Examiner William H. Smith in the case of The Texas Company vs. V. S. L. & W. suggests findings that rates on petroleum products of $1.33 to Alamosa, $1.39 to Leadville and Monte Vista and $1.24 to Salida, Colo., from Gates and Port Arthur, Tex., during the fall of 1921 and the early part of 1922 unreasonable to the extent that they exceeded a rate of 98 cents contemporaneously in effect to Deming, N. Mex., and that complainant is entitled to reparation.

Twenty additional firms and companies have been named parties complainant in the case of the International Oil Co. versus the Abilene & Southern Railroad Co. and others. The original complaint filed by the International Oil Co. and 24 associated companies in North Dakota and Minnesota, attacks rates on petroleum and petroleum products from producing points in Texas, Oklahoma and Kansas to points in North Dakota and Minnesota as unreasonable and unjust. The complainants asked for a cease and desist order and the establishment of just and reasonable rates and reparation. The firms and companies named as additional parties complainant are:

Bottineau Oil Co., Bottineau, N. D.; Independent Oil Co., Fessenden, N. D.; Rolla Oil Co., N. D.; Dacotah Oil Co., Fargo, N. D.; Starkweather Oil Co., Starkweather, N. D.; Beaver Oil Co., Strasburg, N. D.; Farmers Oil Co., Wildrose, N. D.; Maddocks Oil Co., Maddocks, N. D.; Sterling Oil Co., Eureka, S. D.; Pyramid Oil Co., Minneapolis, Minn.; West Land Oil Co., Scobey, Mont.; Independent Oil Co., Alexandria, Minn.; Nels Folson, Hoople, N. D.; J. A. Boltz, Barnesville, Minn.; O. H. Voigt, Dent, Minn.; Independent Oil Co., Dent, Minn.; Pearce Oil Co., Frazee, Minn.; Western Fuel & Material Co., Fargo, N. D.; Detroit Independent Oil Co., Detroit, Minn.; J. B. Sprafke and M. E. Ewalz, Detroit, Minn.

The Continental Oil Co. of Denver, Colo., has filed a complaint with the Interstate Commerce Commission against the Atchison, Topeka and Santa Fe Railroad Co. and others, attacking rates as unjust and unreasonable on shipments of gasoline to the extent that they exceed 66 cents per 100 pounds from Casper, Wyo., 60 cents from Florence, Colo., and 73 cents from Wilmington, Richmond and El Segundo, Calif., to Ogden, Provo and Salt Lake City, Utah. The complaint asks for a desist order and reparation.

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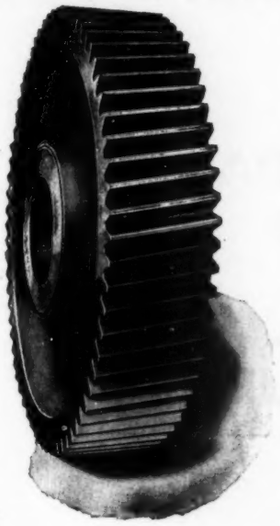

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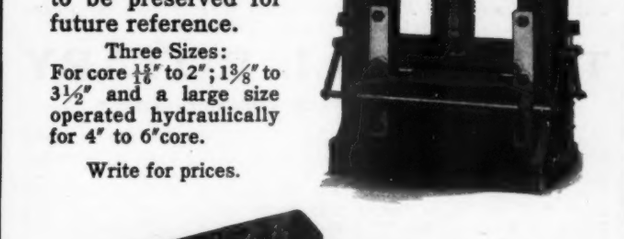

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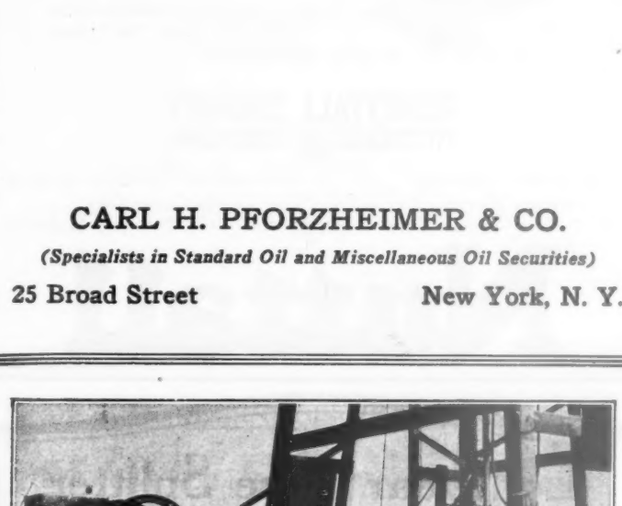

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HYDRAULIC MIGRATION OF OIL CONSIDERED IN CANADIAN FIELD

CHATHAM, Ont., May 1.—An advance report by Dr. G. S. Hume of the Geological Survey of Canada covers the 1925 operations in the Wainwright Field of east central Alberta in part as follows:

At the end of 1925 British Petroleum, Ltd., had drilled five wells in the Wainwright Field. These wells are all in one fold which is called the Battle River-Wainwright fold. The positions of the wells and their present condition follow:

British Petroleum's No. 1, Section 36-45-7w4. Gas flow reported, indication of oil, well abandoned, hole filled with water.

Britsh Petroleum's No. 2, Section 30-45-6w4. Heavy flow of gas, considerable heavy oil, water troubles giving an emulsion with the oil. Gas used in 1925 for fuel in drilling No. 3-B well. Oil horizon is in the Benton formation at a depth in the well of 2,019 to 2,036 feet.

British Petroleum's No. 3, Section 29-45-6w4. Sands encountered in the Benton formation giving a show of oil and some gas but no production. Well deepened to formation (lower Cretaceous) underlying Benton and good indication of oil found. Well abandoned on account of production troubles. Well plugged during 1925.

Britsh Petroleum's No. 3-B, Section 29-45-6w4, location only a short distance from No. 3. Drilled in 1925. Came in as an oil well from sands in Lower Cretaceous at a depth of 2,239 to 2,259 feet. Production estimated by the driller at 50 to 75 bbls. per day. Well is being pumped.

British Petroleum's No. 4, Section 30-45-6w4, drilled in 1924. Flow of oil accompanied by gas from the same horizon that gave oil in No. 2 well. Considerable oil produced and shipped for use of Canadian National Railways. Gravity about 13.9 Baume. Well showing water in 1925.

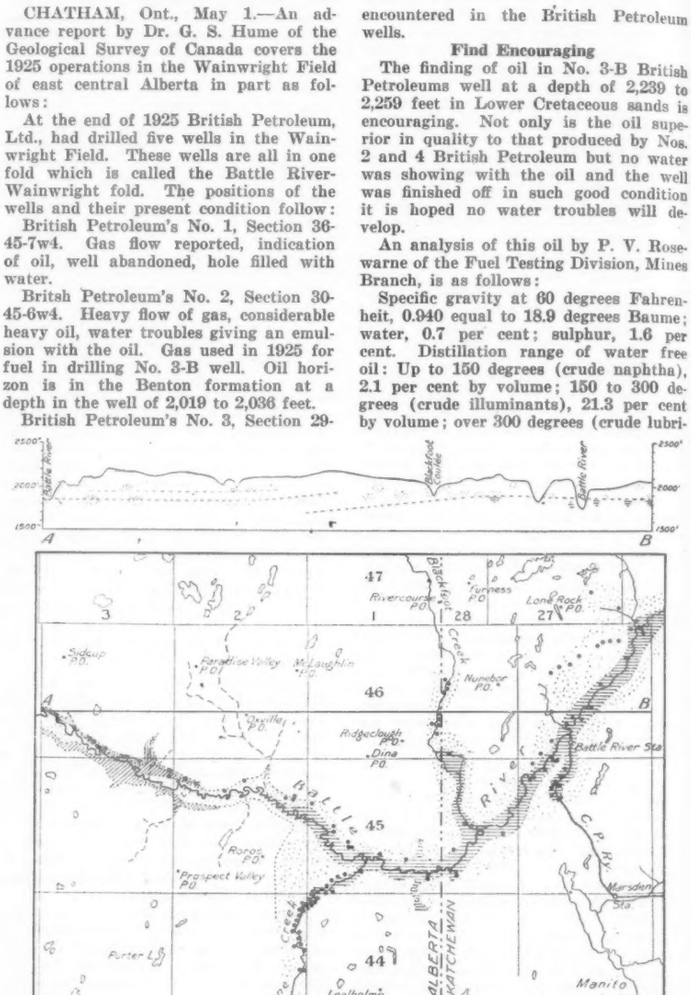
The only other wells being drilled during 1925 in the Wainwright area were one by the Western Consolidated, Ltd., and one by the Interior Oil Co., formerly the Wainwright Producers Syndicate, located about half a mile west of Wainwright. This well has not yet reached a depth at which production is to be expected. Drilling at the Western Consolidated well has temporarily ceased without reaching the depths at which oil was encountered in the British Petroleum wells.

Find Encouraging

The finding of oil in No. 3-B British Petroleums well at a depth of 2,239 to 2,259 feet in Lower Cretaceous sands is encouraging. Not only is the oil superior in quality to that produced by Nos. 2 and 4 British Petroleum but no water was showing with the oil and the well was finished off in such good condition it is hoped no water troubles will develop.

An analysis of this oil by P. V. Rosewarne of the Fuel Testing Division, Mines Branch, is as follows:

Specific gravity at 60 degrees Fahrenheit, 0.940 equal to 18.9 degrees Baume; water, 0.7 per cent; sulphur, 1.6 per cent. Distillation range of water free oil: Up to 150 degrees (crude naphtha), 2.1 per cent by volume; 150 to 300 degrees (crude illuminants), 21.3 per cent by volume; over 300 degrees (crude lubricants), 69.0 per cent by volume; coke, 10.9 per cent by weight.



Geology along Battle River in the vicinity of the Alberta-Saskatchewan boundary. The east-west structural section has been constructed by projecting outcrops upon a single plane and by assuming a strike of N. 45° E. Areas of Birch Lake formation are indicated by a pattern of vertical lines; of Grizzly Bear, by inclined parallel lines; of Ribstone Creek, by stipple; of Lea Park, by horizontal lines; and rock outcrops by large dots.

The finding of oil in the Lower Cretaceous sands leads to expectation that oil may be present in the same horizon at other locations. Of the wells drilled by British Petroleum, Ltd., No. 2 well contains much the largest supply of gas, and it is thought a test of the deeper horizon would be worth undertaking. In making such a test it should be realized nothing is known of the extent of the lower productive horizon encountered in No. 3-B well. If this horizon were found to be oil bearing in the vicinity of British Petroleum's No. 2 and if it gave a flow of gas larger than at No. 3-B and under higher pressure, a good flow of oil might be obtained. It is understood the Dome Oil Co. is endeavoring to arrange to drill such a test in 1926, the location being about 300 feet from the location of British Petroleum's No. 5 on LSD 7, Section 31-45-6w5.

Besides the test of the Dome Oil Co. it is understood preparations are under way to drill about 600 feet north of British Petroleum's No. 3-B by the Edmonton-Wainwright company which has also made arrangements to complete the well of the Irma Oil Development Co. on Section 28-45-9w4. This location is west of the town of Irma and may be on the northwest extension of the Hawkins fold.

The wells of the Western Consolidated

Oil Co. and the Interior Oil Co. are expected to be completed this year.

It may safely be said that the results obtained from British Petroleum's No. 3-B have greatly increased the importance of the Wainwright Field and a considerable development is to be expected.

Detailed Examination

During 1925 a more detailed examination was made of the area in the vicinity of Battle River from Range 3w4 to Range 24w3, following which a reconnaissance survey was continued over an area in Saskatchewan south of North Saskatchewan River and from the Fourth meridian east to longitude 108 and south to latitude 52. This work was also continued into Alberta south of the Wainwright sheet in an area bounded on the west by the Fourth meridian, on the east by longitude 111, and on the north by latitude 52.

An advance report covering the results secured, and dealing particularly with oil and gas prospects and development, is now available from the Geological Survey at Ottawa. Doctor Hume's report shows the following sequence of formations over the whole area studied: Bearpaw formation (marine); pale and variegated beds (non-marine); Birch Lake formation (mostly non-marine); Grizzly Bear formation (marine); Ribstone Creek formation (non-marine in Alberta, partly marine in Saskatchewan); Lea Park formation (marine) Benton formation (marine—not exposed); Lower Cretaceous (not exposed); Palaezoic limestones (not exposed.)

To the eastward of the foothills the thickness of the post-Devonian, pre-Cretaceous sediments gradually decreases, these rocks assuming a wedge-like form with the position of the eastern thin edge of the wedge entirely unknown. It has been assumed by many, though not definitely proved, that the productive wet gas horizon in No. 4 Royalite well, Turner Valley Field, southwest of Calgary, is in the Carboniferous. If in the north, as is thought to be the case, the Carboniferous wedges out to the east and northeast and is not present in the Wainwright area and vicinity, the possibilities of finding oil in the Palaeozoic limestones in the Turner Valley and in the Wainwright fields are said not to be comparable.

Everywhere in the area studied the regional dip is gentle. Local dips in the Pale Beds in the vicinity of Tit Hills are believed to be due to superficial causes and have no relation to underground structure. Local structures which might be considered possible oil and gas structures are difficult to detect except where a definite horizon can be followed and the structure determined by carefully run lines of levels. No such structures were found with the exception of those located by reconnaissance work in the previous summer.

Detailed leveling was done on one structure only, the anticline on Battle River in the vicinity of the Alberta-Saskatchewan boundary, called the Ribstone-Blackfoot anticline.

Ribstone-Blackfoot Anticline

At this point various lines of evidence indicate the existence of a fold or anticline with a northeast-southwest strike, the crest of which is in the vicinity of the exposures of the Ribstone Creek formation 2 miles southwest of the mouth of Ribstone Creek. With a northeast-southwest strike the crest of this anticline should lie slightly east of the exposures of Ribstone Creek rocks on Blackfoot Coulee, in Section 12-46-1w4. The rate of dip on the northwestern flank of this anticline is about 23 feet per mile for 12 miles in a northwest direction and on the southeastern flank 7 to 10 feet per mile southeasterly for an unknown distance.

The question whether such a broad anticline is likely to have caused an accumulation of gas and oil is not easy to answer without drilling, even supposing other conditions than structure are entirely favorable. A flow of gas was obtained at 290 feet in a water well drilled in NW, Section 24-46-1w4. It is thought that this gas flow must be derived from the base of the Ribstone Creek formation and the well being located on the northwest flank of the anticline leads to the conclusion that this shallow gas is associated with the structure.

If such is the case it would seem reasonable to suppose a structure sufficient to cause an accumulation of gas at a shallow depth where seepage to the surface would be comparatively easy might also cause a much larger accumulation at depth provided strata of sufficient porosity to act as a gas reservoir are present under conditions favorable for the retention of the gas.

From wells drilled in various localities on the Plains, sands of sufficent porosity to carry oil and gas are known to be present at the base of the Colorado and in the Lower Cretaceous. There is no known reason to assume their absence at this locality and the Benton shales form an effective cover for a gas or oil field.

Thus, although the structure as interpreted seems to be quite broad, it is the best-known structure in this part of Alberta and Saskatchewan to test for gas, the closure of the structure in an east-west direction being several times that of the Wainwright structure in which oil and gas has been found.

Crests of Two Folds Coincide

The merits of this fold as a cause of the accumulation of oil and gas have been considered only in relation to the fold itself. It happens that the crest of this minor fold coincides with that of a much broader regional one, the minor fold being superimposed on the larger one. Evidence for this broader regional folding is quite conclusive. On Ribstone Creek the top of the Lea Park formation is exposed. Westward the higher formations appear until in the Irma-Viking area the Pale-Variegated beds outcrop. The sequence of formations from east to west indicates a southwest dip which is modified in a number of places by local variations giving small structures. The amount of dip from Township 45-1w4 to the Imperial (Fabyan) well in Township 45-7w4 is about 230 feet whereas there is a southeast dip of about 500 feet from Township 45-1w4 to the Muddy Lake well in Township 39-22w3, this latter dip being about 10 feet to the mile.

It is a reasonable conclusion, Doctor Hume continues, that the larger regional structure as well as the smaller local structures has had some influence on the accumulation of oil and gas, and since the tendency is for oil and gas to accumulate toward the crest of any structure, the crest of the major structure would be considered to be a favorable location. But since the crest of the major structure coincides with that of a well-marked minor structure there is a further reason for regarding the minor anticline as a structure favoring the accumulation of oil and gas.

Predictions regarding the presence of oil in this structure are hazardous but there are reasons based on certain assumptions which suggest the Ribstone-Blackfoot anticline might offer favorable prospects for oil. A consideration of the regional distribution of oil and gas leads to this belief. The distribution in eastern-central Alberta is as follows:

Viking fold. Twelve gas wells of large capacity. No oil.

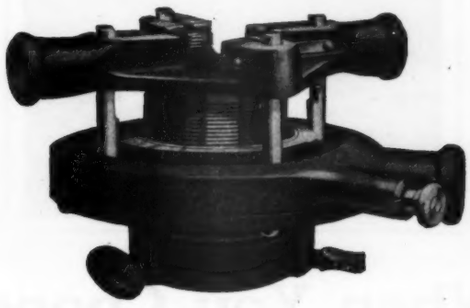
Hawkins fold. Gas in Grattan No. 1 well. No oil.

Fabyan fold. Gas in Imperial (Fabyan) No. 1 well. Gas in Maple Leaf No. 1 well. Small amount of oil in Imperial (Fabyan) No. 1 well.

Battle River-Wainwright fold. British Petroleum's Nos. 2, 3-B and 4 wells are oil wells with some gas.

Hydraulic Theory Quoted

Thus from west to east there seems to be in these local folds a tendency for more oil toward the east. This may be a coincidence but there is a possible explanation based on the hydraulic theory of oil migration and accumulation developed by Munn and elaborated by Rich who states "the principal cause of the migration of oil and gas is the movement of underground water which carries with it minute globules of oil and bubbles of gas, possibly as fast as they are formed. Accumulation results from



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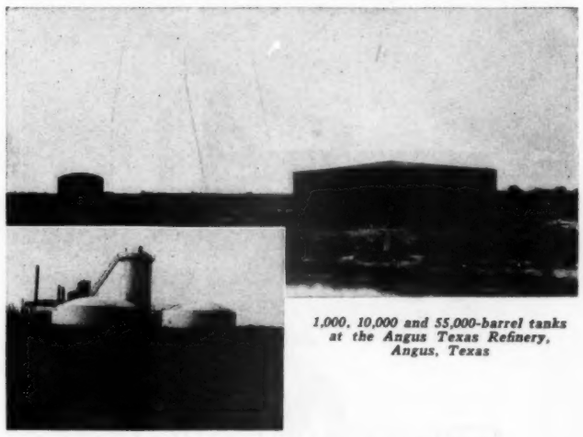

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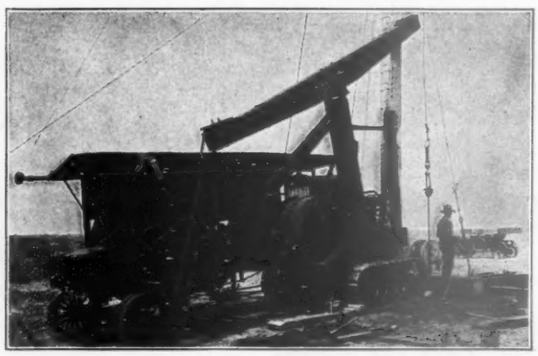

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the selective segregation of oil and gas, which, on account of their buoyancy, always tend to work their way upward as they are carried along and are caught and retained in anticlinal or other suitable traps. The nature of the trap necessary to cause accumulation depends on the rate of movement of the water and corresponding texture of the sands or other medium through which it flows. Where the sands are porous and there is a strong hydraulic head a sharp anticline with large closure is necessary to retain the oil, in fact, where the movement is especially rapid even such a structure may be inadequate. Where the sands are fine and the water movement is slow, slight structural and textural variations are enough to arrest the movement of the oil and gas. Under such conditions broad flat anticlines with little closure, terraces, or even minor flattenings of the regional dip are enough to cause accumulation." This theory has been applied by Rich to such basins as the Big Horn in Wyoming and other larger basins in the United States and not only is the theory apparently in accord with the facts but by means of it the locations of oil and gas fields can be predicted.

If the theory is applied to the structural conditions in Alberta it is apparent there is no reason why water would not enter porous horizons in the Cretaceous of the foothills and travel eastward through the Alberta syncline towards the outcrops of the same formations at the much lower elevations on the plains east of the syncline. It has been pointed out by Rich that where the flow is rapid, sharp structures of large closure are necessary to prevent flushing of the oil and gas while structures of similar magnitude away from the inlet or near the outlet have been demonstrated to be highly productive. It has also been shown by Rich that "near the limit of complete flushing gas, on account of its greater buoyancy, would be retained on structures which were unable to hold oil." Also starting "from the intake rim the normal sequence in such a basin would be anticlines completely flushed; anticlines holding only gas; anticlines holding gas and a little oil; anticlines holding oil and gas."

Theory Applied to Alberta

The similarity of these conditions which have been shown to hold in oil fields of the United States and the conditions found in the folds of eastern-central Alberta is very impressive; in fact, the conditions as known, that is, gas in the Viking fold, gas in the Hawkins fold, gas with a little oil in the Fabyan fold and oil and gas in the Battle River-Wainwright fold are exactly what would be predicated on the basis of the hydraulic theory on the assumption that water movement was fairly strong in the Viking gas field and the closure of the fold was insufficient to retain oil whereas further east in the Battle River-Wainwright fold the structure was sufficient to restrict the water movement and allow the accumulation of both oil and gas.

In Alberta there can be no doubt of the direction of possible migration because of the high inlet in the foothills and the lower outlet on the plains. The Viking gas field is far removed from the inlet and at this distance water movement might be expected to be comparatively slow but the Viking fold has a relatively small closure and for this reason may have been flushed of oil. In only one well, as far as the writer is aware, a showing of oil of no importance was encountered, and, if any oil was originally present in the Viking structure, the results of drilling to date give no indication that oil may be expected to be found there now.

Since the flushing effect due to water movement should be progressively less eastwards, because of the wider dispersion of the water, the folds to the east, provided they are of sufficient magnitude, should have received the oil. It would be expected, therefore, that as regards oil, folds east of the Battle River-Wainwright fold should be even more favorably situated than is the Battle River-Wainwright fold, and on this basis the Ribstone-Blackfoot anticline is favorably situated for oil accumulation.

This is even more the case than position alone indicates since the closure of the Ribstone-Blackfoot anticline in a northwest-southwest direction is several times that of the Battle River-Wainwright fold. Also as the Ribstone-Blackfoot anticline is on the crest of a broad regional fold there would be a tendency to restrict water movement farther eastward and to cause oil and gas to accumulate in the area of stagnation.

Thus, on the basis of the hydraulic theory, not only is an explanation offered that accounts for the distribution of oil and gas in this part of Alberta but a consideration of the factors involved also makes very plausible the conclusion that there is an accumulation of oil in the Ribstone-Blackfoot anticline. These conclusions are of far-reaching importance as regards the possibilities of oil in Alberta and Saskatchewan.

As a test of the applicability of the hydraulic theory in Alberta, the positions of seepages of oil and gas are instructive, and it would seem in this case also that the facts fit predictions that the application of the theory would justify. If in Alberta there has been this water movement flushing the oil and gas eastward, then seepages of oil and gas should appear at the outcrops of the oil-bearing beds where the water finds outlet. Doctor Hume regards the bituminous sands of Alberta on Athabaska River as representing such a seepage on a large scale and believes the bitumen has been derived from alteration of oil which was present and originated in Cretaceous strata.

On the east side of the Sweetgrass Indian reserve, Section 7-45-18w3, there is a seepage of oil. This is the only seepage of oil that Doctor Hume has observed in this part of Saskatchewan, but seepages of gas are reported at a number of places on the banks of North Saskatchewan River. These seepages may be explained on the basis of the hydraulic theory on the assumption that the gas and oil has been carried eastward by the movement of underground water and that the seepages occur at the outcrops of the oil and gas-bearing beds. Interpreted in this manner, oil and gas seepages in Saskatchewan may mean only that porous beds there outcrop and that such seepages are no indication of oil and gas accumulations below or in the vicinity of the point of seepage. It must, however, be borne in mind that seepages also result from deep-lying accumulations but at such points structures such as cause accumulation would be expected to be present.

Recommendations for Drilling

If test wells are sunk on the Ribstone-Blackfoot anticline it is recommended that the first be in the vicinity of Blackfoot Coulee near the present gas flow from the shallow well. It is believed this location would be a considerable distance down the northwest flank of this fold and would thus be a fair test of the oil possibilities of the fold.

It is possible, however, Doctor Hume adds, if oil is present in this field it will also occupy the crest of the fold as in the Battle River-Wainwright structure. Since the highest known point on the structure is on Ribstone Creek 2 miles southwest of Battle River, this place might be considered as an alternative to the other location.

Further locations will depend on conditions found in the first well but in no case is it believed that one dry hole will entirely disprove the oil and gas possibilities of this anticline.

The depth in any wells of the productive oil and gas horizon will depend on the position of the well relative to the geological structure, but in no instance is it thought that the depth to the sands at the base of the Benton will be less than 1,500 feet or more than 1,800 feet and the equivalent of the Lower Cretaceous horizon producing the oil in No. 3-B British Petroleum well will be 200 to 225 feet lower.

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Utilization of Our Oil Reserves to Get Fullest Advantage

By Earl Oliver*

It would be well first to come to a clear understanding on our attitude toward Government control, by which of course is meant a degree of control beyond that which it exercises over industry generally. A misunderstanding regarding the attitude of the Federal administration during the past year threatened to place a very excellent institution of the petroleum industry as well as the industry itself in a position embarrassing both to the administration and to the industry. Happily, that misunderstanding began to clear up as the parties became better acquainted.

My own impression is that assumption of Government control in any form is farthest from the thought and desire of the administration, and that as a matter of fact the intelligent inquiry being made is one of the greatest protections the industry has against the danger of this character of encroachment from less well-informed agencies of government. I wish, therefore, to remove any danger that what I say may be imputed as an expression in any form in favor of an increased amount of Government control in the petroleum industry. There is no crisis at this time in the petroleum industry. We have no unusual situation. Every industry constantly has problems before it to settle.

Such economic evils as there are connected with the petroleum industry, and as stated there are always some within every industry, must be cured by the petroleum industry itself. We can cure them only through a study of them; by a knowledge of what they are; by talking together about them. Personally I am not one who fears the effect of this character of discussion in the open. If the public sees the industry diligently studying its own problems, endeavoring to remedy the evils that affect it, we may rest assured there will no danger of ill-considered or undesirable regulatory legislation imposed upon us. The public has sufficient intelligence to realize that no other agency can correct the economic evils of the industry so efficiently as that industry itself—if it will. Demagogic politicians, if such there be, will have little support in their attempt to harass an industry that is obviously making good faith effort to bring its operations into harmony with sound principles of political economy, impressed with a sense of its public obligations, and obviously more capable of doing that than any other agency is of directing it. I might state also that this term "demagogic politicians" is perhaps too freely used. Frequently, quite generally perhaps, the legislator knows too little about the matter on which he proposes to legislate, but his mistakes are usually ones of ignorance rather than intent. When we are educating ourselves by a study of these problems, we likewise are educating the public, and incidentally we might also be educating these legislators whose ill-considered actions we so frequently deplore. There is, therefore, every reason why we should discuss these matters frankly and openly.

Most Satisfactory Regulator

In the petroleum industry the law of supply and demand working freely would be a much more satisfactory regulator of the amount of oil to be produced than would be any arbitrary control imposed either by the Government or by the industry; in fact arbitrary restrictions on production imposed by industry would be even more objectionable than would be those imposed by Government, but neither are so well qualified as are economic forces to determine the amounts to be extracted; that it is the function of Government to assist in keeping these and other economic laws working freely. (In my judgment competitive drainage within

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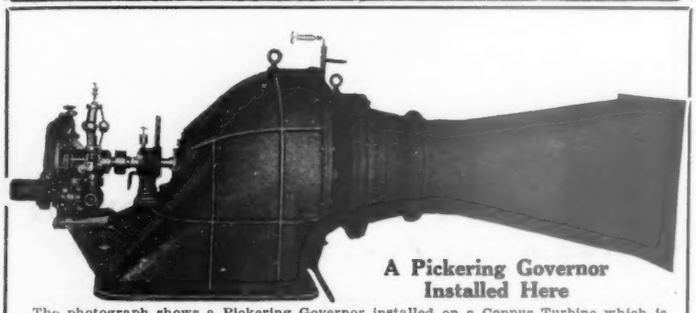

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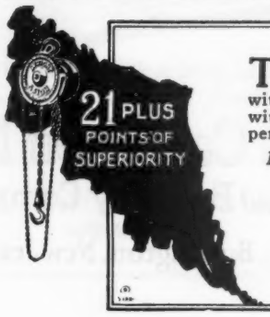

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each pool prevents free operation of the law of supply and demand in the petroleum industry). It is suggested no restriction as to preferential use other than that imposed by economic law is practicable.

The petroleum industry is perhaps no less efficient than are many other industries but that does not excuse us from scrutinizing our own inefficiency. The principal use being made of petroleum is in the generation of power. The extent to which the potential energy that was stored up in those petroleum lands now being depleted is translated into mechanical power under our present practices is, therefore, our measure of efficiency. This translation of power is in two stages. First—extraction from the ground. Second—utilization after extraction.

It is well known that approximately one-half the petroleum extracted is burned as fuel under boilers. This is ordinarily considered much less efficient than internal combustion utilization. If we extract but one-seventh of the petroleum content of the sand, as stated by J. O. Lewis, and of that one-seventh extracted convert into mechanical power in Ford engines, only 3½ per cent of its energy, as stated by C. F. Kettering, that would mean conversion into mechanical power of only one-half of 1 per cent of the potential energy in the petroleum lands depleted.

Standard of Efficiency

In a period when mechanical power of a certain kind may mean supremacy to the nation, and when the fuel from which that power is derived is of uncertain quantity, a method of depletion and utilization that translates into mechanical power only one-half of 1 per cent of the potential energy that had been stored up in the lands depleted certainly cannot be looked upon as a very satisfactory standard of efficiency. Please understand automotive experts do not name a possible standard of efficiency higher than 8½ per cent, but that would mean from 10 to 20 times the mechanical power now being secured. This figure is so surprising that I would hesitate to quote it except for the recognized standing of the men from whose estimates it is deduced. If these estimates are correct, and I assume they are substantially correct, then it would appear society is justified in making its respectful inquiry.

What then is the explanation of this very low degree of efficiency? Why do we leave six times as much oil in the ground as we take out? Why do we secure such a very small amount of power out of that one-seventh extracted?

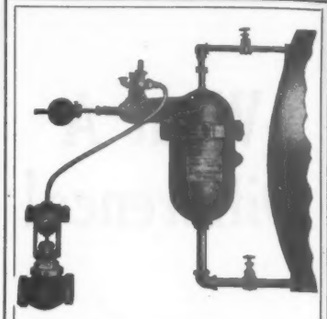
These are extremely perplexing questions. No doubt many influences contribute to those results, but an analysis of the whole problem appears to point to competitive drainage as the principal cause—that condition which compels us to extract the oil with the greatest possible speed immediately after discovery—the fact that pools are cut up into many ownerships without your yet having found a means by which the several owners can be persuaded to cooperate fully on policies for their common good. It would seem that the speed with which this competition compels extraction of the oil does not permit delay to secure cooperation or to use the type of engineering practices necessary to secure efficient extraction.

Then after it is extracted we are compelled to put it somewhere. The producer dumps it on the refiner; the refiner dumps it on the marketer, and the marketer dumps it on the consumer. The necessity away back there to take it out of the ground with the greatest possible speed causes it to keep piling up and pushing on. The economic pressure is to get rid of it.

It is familiar human experience that an overabundance makes wasteful utilization. It would appear, therefore, that in addition to the low extraction pointed out by Mr. Lewis, the 3½ per cent efficiency in utilization pointed out by Mr. Kettering is also partly due to competitive drainage.

Haste Makes Waste

All of us are, of course, familiar with the radically different manner development progresses around a new discovery



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when the acreage is badly cut up as contrasted with solidly held blocks. Where acreage is solidly held around a discovery well we know that only one or two additional wells are started and that further development awaits information to be disclosed at the completion of these wells, influenced also by the performance of the discovery well in the interval. The extent of the field is cautiously felt out a well or two at a time. Dry holes are thus prevented. Development is extended only as rapidly as the owner requires the oil for his business; gas is conserved; little storage is required. If market conditions are not right oil is left in the ground until it is right and then brought out only as the market will take same without serious injury to the price structure. Few of this type of fields exist, but such as do or have existed were never considered menaces to the industry, for it was well known that they would not be rapidly drawn upon in such manner as to break down the price structure. They also became actual proven up oil reserves, desirable both from the nation's viewpoint as well as from the owner's viewpoint.

On the other hand you are equally familiar with the type of development that characterizes the vicinity of a discovery well when the acreage is badly cut up. Without awaiting to ascertain whether a new pool has been opened or merely a freak well discovered, many additional tests are started at once, regardless of market conditions; regardless of pipe line facilities; regardless of needs of the owner for the oil for his business at that time. Feverish activity continues and if the discovery well has actually opened a pool the total quantity is extracted in the shortest possible time regardless of the needs of the industry, in spite of the fact that a nation's valuable resources are being ruthlessly depleted without any need for the same. They are forced into channels of consumption wholly inefficient and which have no incentive to more efficient utilization because the price is so low that efficient utilization is no inducement. Perhaps worse than all these, however, is the fact that under this type of development the gas is permitted to escape freely. Pressures are reduced, permitting the gas to come out of solution, increasing the viscosity of the oil. Much of the oil that would otherwise flow readily to the well and be extracted becomes congealed and remains clinging to the sand grains.

Example of Smackover

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Advancement in the successful application of science to the discovery of new pools is even more rapid than our advance in conserving in the output of those pools discovered. We now bring a pool to a state of development and depletion in months that required an equal number of years 20 years ago. Must we consume

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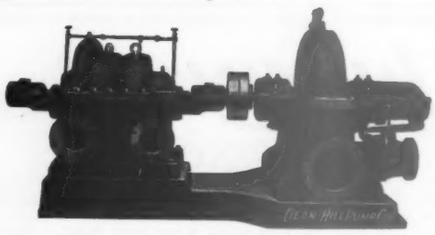

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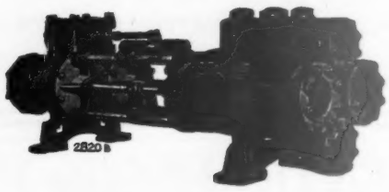

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Undiscovered Pools

If this nation has in undiscovered pools even 50 or 100 years' supply from the life of a nation that would be short and unfortunate. If though through the aid of science we discover that 100 years' supply in two years or ten years must we continue our present practice of taking it out and burning it at once? What would happen to the industry's values if we do—and yet that is what competitive drainage compels us to do. Do you realize the extent to which science is concentrating on this hunt for new pools? I know of nothing more dangerous to the stability of petroleum property values than perpetuating this competitive drainage factor. It floods the markets, destroys values and prevents the building up of proven reserves against the time of failure to discover. After science will have utilized all its accumulated wisdom and we burn up in this manner those pools discovered—what then? None of these conditions might occur, but if they do not it is not because of a constructive thought put forth by the industry to prevent their happening, but because the fates are good to us.

There is, I believe, no immediately serious danger threatening either the petroleum industry or the nation in respect to these resources and yet it is only the part of wisdom for the industry to so conduct its business as to eliminate that danger.

Arkansas had a wonderful heritage in the oil and gas from these fields that could have been highly profitable to those who developed them, highly beneficial to the state, and certainly of much greater benefit to the consumer. But to this time much of that heritage has been dissipated without any great benefit to any one of the three parties involved.

No one regretted or tried harder to prevent that dissipation in this manner than you, but you were ruled by the customs and practices that have been fastened on the petroleum industry. The fields of Oklahoma were developed in the same manner; so were those of Texas; in like manner were those of California. For several years each new field discovered has been regarded as a disaster to the industry, instead of the blessing it should have been. Certainly the industry cannot rest content in dissipating the nation's resources in this manner, nor could the nation rest content in having its recources so dissipated.

Hand-to-Mouth Basis

It matters not whether those resources comprise a 10 years' supply or 110 years' supply, there is in either case no justification for conducting a great industry on the fluctuating unstable, hand-to-mouth basis that characterizes the petroleum industry. But I am convinced there is no need to urge that viewpoint in this meeting. It would be more pertinent to point out how it could be overcome.

I am sorry, however, gentlemen, to advise I have heard no one propose an easy method for its correction. If these evils do, as I believe, very largely arise out of competitive drainage, then they should disappear with the disappearance of com-

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petitive drainage. Until, however, sufficient interest is aroused within the industry to induce operators in a common pool to cooperate 100 per cent on certain points of common interest where the action of one compels like action on the part of others, or some outside force compels them to do that I know of no way competitive drainage can be avoided.

From an engineering viewpoint one operating unit of each pool would of course completely solve the difficulty. Efficient extraction would then become a decidedly simple engineering problem making possible the ideal extraction suggested by Mr. Lewis. In addition the ability under these circumstances on the part of each operator at no loss to himself to withhold production until these temporary oversupplies had passed would steady the market and perhaps induce some of that improvement in utilization described by Mr. Kettering as being so easily possible. Furthermore it would make of the producing end of the oil industry a business with some stability instead of the hectic speculation that it now is. It would cause the development of a dependable proved reserve for the nation. It would enable Arkansas to utilize the oil and gas from its Smackovers over a period of a generation or more to build up permanent industries instead of devastating them in five years or less of ephemeral excitement.

Engineering Viewpoint

While from the engineering viewpoint one unit for each pool is ideal, from the broader outlook of political economy this must be taken with some reservation. The small operator must be protected and should be perpetuated, for thus new blood is injected into the industry and competition maintained. To secure the efficiency of the former and not lose advantage of the latter is the difficult task confronting the industry. Perhaps some middle ground can be found.

It is somewhat significant and also surprising that out of the 16 speakers who appeared before the Federal Oil Board February 10 and 11, four speakers in one form or another in effect stated that whether we like it or not unit operation in some form is immediately ahead in the petroleum industry; that more efficient methods of extraction, such as air, gas, and water drives and retention of gas pressure will compel that development. Others of the 16 looked upon it as a probable tendency and none disputed or opposed it. But of course there were decided differences of opinion as to how it should be assisted in coming about.

The extreme position advocated compulsory unit operation imposed by Government. The other extreme urged that it be left solely to the industry to work out, undisturbed and unassisted. The middle course urged that it be worked out through cooperation of industry and government. Just how it will come seems uncertain, but that it will come there can be little doubt.

The industry during this past year has acquired and now is acquiring much new information regarding the relationship of gas to oil, and how important is the proper utilization of the gas already associated with the oil in increasing the efficiency of extraction of oil from the sand.

When it is considered that oil flowing through the sand to the drilled hole must pass through minute interstices between sand grains, which passageways are so small as to be imperceptible to the naked eye, we can begin to appreciate how important it is that it remain in highly fluid state—not clinging to the sides of these minute passageways and thickening up, refusing to flow by virtue of the gas escaping from solution. We can also understand how six-sevenths might under some circumstances remain in the sand, clinging to the walls or entirely filling the more minute passageways. Obviously for more efficient extraction it is highly important as much pressure as possible be retained on the sand in order that the greatest possible amount of gas will remain in solution. It is equally obvious the failure of any one operator in the pool to retain pressure on his wells would

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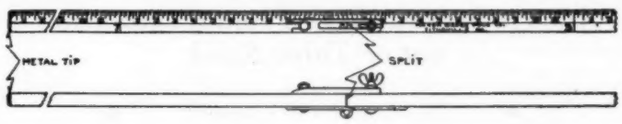

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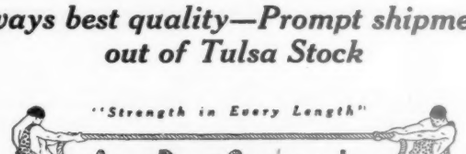

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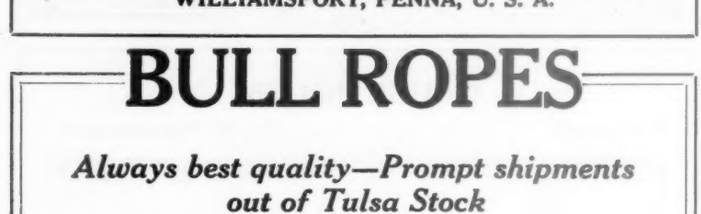

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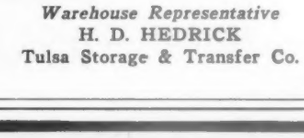

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absolutely prevent its application on any property. It is also obvious that a difficult engineering problem is here encountered in inducing a flow toward the well and yet retaining back pressure—an engineering problem almost impossible of solution where pools are cut up into competitive holdings. It can be applied to best advantages only under unit operation. Water and air drives to a like degree require unit operation. The advantages of all these are now so generally known that they are affording, or may soon afford, the necessary incentive for voluntary cooperation.

But bringing about these necessary changes involves more than a mere engineering problem. It is a much broader one of political economy — merely to stabilize the petroleum industry and conserve the national petroleum resources, does not justify our ruthlessly disturbing other equally or more important practices and institutions that have become inherent in our political and economic structure. Neither may we impose upon Government new and undesirable functions.

I stop as I began—That it is the industry's problem; that education precedes legislation; that such Government assistance as may be necessary should be incidental and contributory — not the main compelling force; that since the utilization of this resource is not being conducted efficiently the industry has a duty to society that it should perform.

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WHAT AND WHERE TO BUY

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Emsco Derrick & Equipment Co.
Generators—
Westinghouse Electric & Mfg. Co.
Generators—Acetylene—
Oxweld Acetylene Co.
Generators—Steam—
Baker Motors, Inc.
Generators—Turbine —
Moon Manufacturing Co.
Pyle-National Co.
Westinghouse Electric & Mfg. Co.
Glassware—Chemical for Laboratory Use—
Illinois Glass Co.
Governors—
Equitable Meter & Mfg. Co.
Gardner Governor Co.
Governors—Boiler Feed—
Chapin-Fulton Mfg. Co.
Fisher Governor Co.
Grey Iron Castings (See Castings)

H

Hammers—Chipping and Calking Pneumatic—
Chicago Pneumatic Tool Co.
Hammers—Riveting Pneumatic—
Chicago Pneumatic Tool Co.
Hangers—Iron and Steel—
Continental Supply Co.
Dodge Mfg. Corp.
Hangers—Tubing—
Hercules Tool Co.
Hatches—Gauges and Thief—
Oil Conservation Engineering Co.
Heat Exchangers —
Carbondale Machine Co.
Griscom-Russell Co.
Hope Engineering & Supply Co.
National Gas Products Co.
Newton Process Mfg. Co.
Ross Heater & Mfg. Co.
Southwestern Eingineering Co., Inc.
Southwestern Engineering Corp.
Heat Exchangers—Fluid—
Braun, C. F., & Co.
Ross Heater & Mfg. Co., Inc.
High Pressure Gate Valves (See Valves)—
Hoists—Pneumatic, Geared and Universal—
Chisholm-Moore Mfg. Co.
Yale & Towne Mfg. Co.
Hoists—Portable—
Chisholm-Moore Mfg. Co.
Ford Chain Block Co.
Sullivan Machinery Co.
Wright Mfg. Co.
Yale & Towne Mfg. Co.
Hooks for Rods and Tubing—
B. & A. Specialty Co.
Dunn Mfg. Co.
Hose—
Fenwick-Reddaway Mfg. Co.
Hose—Drillers—
Goodrich, B. F., Rubber Co.
United States Rubber Co.
Hose—Oil Suction and Discharge
Goodrich, B. F., Rubber Co.
United States Rubber Co.
Hose—Rubber—
Goodyear Tire & Rubber Co.
United States Rubber Co.
Hot Rolled Strip Steel (See Steel)
Hydraulic Jacks (See Jacks)—
Hypochlorite of Lime—
Mathieson Alkali Works, Inc.

I

Insulation Materials —
Celite Products Co.
Johns-Manville, Inc.
Insurance—Fire—
Oil Insurance Association
Insurance—Tornado—
Oil Insurance Association
Iron—Ingot—
American Rolling Mill Co.

J

Jacks—Hydraulic—
Bridgeport Machine Co.
Jacks—Lifting—
Templeton, Kenly & Co., Ltd.
Jacks—Pumping—
American Mfg. Co. of Texas.
American Wells Works.
Bessemer Gas Engine Co.
Braden Co.
Frick-Reid Supply Co.
Jones, S. M., Co.
Kansas City Hay Press. Co.
Norris, W. C.
Spang & Co.
Jars—
Arbon, Paul, & Co.
Bridgeport Machine Co.
Spang & Co.
Jar Steel—
Andrews Steel Co.
Heppenstall Forge & Knife Co.

K

Kerosene—
Empire Refineries, Inc.
Gulf Refining Co.
Magnolia Petroleum Co.
Pure Oil Co.
Skelly Oil Co.

L

Lacquers—
Arco Company, The
Sherwin-Williams Co.
Lanterns—Electric—
Delta Electric Co.
Lead and Mixed Metal Products—
Eagle-Picher Lead Co.
Lead in Oil—
Eagle-Picher Lead Co.
National Lead Co.
Lead Wool and Containers—
Eagle-Picher Lead Co.
Lifting Jacks—(See Jacks)—
Lighting Equipment—
Pyle National Co.
Westinghouse Electric & Mfg. Co.
Liquid Level Controls (See controllers)—
Litharge—
Eagle-Picher Lead Co.
National Lead Co.
Loaders—Trucks—
Barber-Greene Co.
Long Distance Telephone—
American Telephone & Telegraph Co.
Lubricating Devices—
McCord Radiator & Mfg. Co.
Lubricating Oils (See Oils)—
Lubricators—
Ajax Iron Works.
Lunkenheimer Co.
Lubricators—Force Feed—
Manzel Brothers Co.
McCord Radiator & Mfg. Co.

M

Machine Tools—
Ryerson, Jos. T., & Sons, Inc.
Manholes—Tank—
Brooks Engineering Corp.
Manifolds—
Reid, Joseph, Gas Engine Co.
Meters—Gas—
Equitable Meter & Mfg. Co.
Foxboro Co., Inc.
Metric Metal Works.
Pittsburgh Meter Co.
Roots, P. H. & F. M., Co.
Westcott & Greis.
Meters—Gasoline—
Pittsburgh Meter Co.
Meters—Oil—
Pittsburgh Meter Co.
Molded Goods—Rubber—
Goodyear Tire & Rubber Co.
Motors—Electric—
Fairbanks-Morse & Co.
Westinghouse Electric & Mfg. Co.
Motors—Gasoline (See Engines—Gasoline)—
Motor Trucks (See Trucks—Motor)—

N

Naphths—
Pure Oil Co.
Natural Gasoline (See Gasoline—Natural)—
Natural Gasoline Plant Equipment
American Tank Co.
Campbell, J. A.
Cooper, C. & G., Co.
Griscom-Russell Co.
National Gas Products Co.
Roots, P. H. & F. M., Co.
Ross Heater & Mfg. Co., Inc.
Smith Separator Co.
Westcott & Greis.
Nitrogen—
Linde Air Products Co.
Nozzles—Spray—
Power Plant Equip Co.

O

Oil and Gas Pipe Line Construction—
Hope Engineering & Supply Co.
Oil Burners (See Burners—Oil)—
Oil Engines, Semi-Diesel (See Engines—Semi-Diesel Oil)—
Oil Field Equipment—
Baker Casing Shoe Co.
Bridgeport Machine Co.
Gaso Pump & Burner Mfg. Co.
International Derrick & Equipment Co.
Iron King Mfg. Co.
Kaw Boiler Works Co.
National Supply Co.
Oil Well Supply Co.
Parkersburg Machine Co.
Parkersburg Rig & Reel Co.
Reed Roller Bit Co.
Regan Forge & Engineering Co.
Reid, Joseph, Gas Engine Co.
Republic Supply Co.
Simplex Equipment Co.
Trumble Gas Trap Co.
Oil Filters—(See Filters—Oil)—
Oil—Fuel—
Crown Central Petroleum Corp.
Empire Refineries, Inc.
Gulf Refining Co.
Magnolia Petroleum Co.
Pure Oil Co.
Sinclair Refining Co.
Texas Company, The
Oil—Gas—
Crown Central Petroleum Corp.
Gulf Refining Co.
Pure Oil Co.
Sinclair Refining Co.
Texas Company, The
Oil—Lubricating—
Barnsdall Refining Co.
Berry's James B., Sons Co.
Crown Central Petroleum Corp.
Empire Refineries, Inc.
Gulf Refining Co.
Humble Oil & Refining Co.
Magnolia Petroleum Co.
Pennzoil Co.
Pure Oil Co.
Sinclair Refining Co.
Skelly Oil Co.
Texas Company, The
Oil—Tractor—
Barnsdall Refining Co.
Gulf Refining Co.
Pennzoil Co.
Pure Oil Co.
Skelly Oil Co.
Oiling Devices—
Lunkenheimer Co.
Oil Meters (See Meters)—
Oil Piping Equipment (See Fittings)—
Oil Reclaiming Process—
Barnickel, Wm. S., & Co.
Houston Pump & Supply Co.
Oil Refinery Equipment (See Refinery Equipment)—
Oil Securities (See Securities)—
Oil Suction and Discharge Hose—(See Hose)—
Oil Well Cementing—
Halliburton Oil Well Cementing Co.
Oil Well Screens (See Screens)—
Oil Well Tools—
D & B Pump & Supply Co.
Hinderliter Tool Co.
Reed Roller Bit Co.
Titusville Forge Co.
U. S. Tool Co.
Over Shots—
Reed Roller Bit Co.
Regan Forge & Engineering Co.
Oxygen—
Linde Air Products Co.

P

Packer Release—
Acme Fishing Tool Co.
Packers—
Goodyear Tire & Rubber Co.
Guiberson Corp.
Larkin & Co.
Layne & Bowler Co.
Oil Well Supply Co.
Regan Forge & Engineering Co.
Spang & Co.
United States Rubber Co.
Packing—
Crane Packing Co.
Durabla Mfg. Co.
Garlock Packing Co.
Goodrich, B. F., Rubber Co.
Imperial Belting Co.
Johns-Manville, Inc.
Packing—Metallic—
Crane Packing Co.
Paint Guns—
Binks Spray Equipment Co.
Painting Equipment—Mechanical
Matthews, W. N. Corp.
Paints—
Aluminum Co. of America
American Asphalt Paint Co.
Arco Company, The
Cook Paint & Varnish Co.
Detroit Graphite Co.
Dixon, Joseph Crucible Co.
Eagle-Picher Lead Co.
Eclipse Paint & Mfg. Co.
Hill Hubbell & Co.
National Lead Co.
Sherwin-Williams Co.
St. Louis Surfacer & Paint Co.
Pipe—Cast Iron—
Greenspon's Jos., Sons Iron & Steel Co.
International Supply Co.
U. S. Cast Iron Pipe & Fdy. Co.
Pipe—Lead Chemical and Anti-Monial—
Eagle-Picher Lead Co.
Pipe—Steel—
Continental Supply Co.
Greenspon's Jos., Sons Iron & Steel Co.
Jarecki Mfg. Co.
Kellogg, M. W., Co.
Murray Tool & Supply Co.
National Supply Co.
National Tube Co.
Republic Iron & Steel Co.
Ryerson, Jos. T., & Sons, Inc.
South Chester Tube Co.
Spang, Chalfant & Co., Inc.
Superior Tube Co.
Pipe—Wrought Iron—
Byers, A. M., Co.
Frick-Reid Supply Co.
Greenspon's, Jos., Sons Iron & Steel Co.
Oil Well Supply Co.
Reading Iron Co.
Superior Tube Co.
Pipe and Nipple Threading Machines—
Bignall & Keeler Machine Works.
Cox & Sons Co., The
Landis Machine Co.
Ryerson, Jos. T., & Sons, Inc.
Pipe Clamps (See Clamps—Pipe)
Pipe Fittings (See Fittings)—
Pipe Grips—
Larkin & Co.
Pipe Headers—
National Tube Co.
Newton Process Mfg. Co.
Pipe Line Coatings—
Hill Hubbell & Co.
Pipe Line Construction Tools—
National Transit Pump & Machine Co.
Pipe Line Ditchers (See Ditchers)
Pipe Line Equipment—
Gaso Pump & Burner Mfg. Co.
Pipe Screwing Machines—
Buckeye Traction Ditcher Co.
Pipe Straightening Machines—
W-K-M Co., Inc.
Pipe Suspension Device—
Stearns-Rogers Co.
Pipe Threaders—Power—
Williams Tool Corp.
Pipe Tools —
Armstrong Brothers Tool Co.
Nye Tool & Machine Works.
Piping—Fabricated—
Kelly & Jones Co.
Midwest Piping & Supply Co.
Piping—Hard Rubber—
United States Rubber Co.
Piping—Steel & Iron—
Crane Co.
Greenspon's, Jos., Sons Iron & Steel Co.
Power Piping Co.
Pistons—
Guiberson Corp.
Heppenstall Forge & Knife Co.
Pistons—Expansion—
Wilson Oil Tool Corp.
Pistons—Sluah Pump—
Guiberson Corp.
Plugs—Bottom Water—
Guiberson Corp.
Portable Drilling Rigs (See Rigs)
Power Units—Portable (See Engines)—
Pre-Heaters—
National Gas Products Co.
Newton Process Mfg. Co.
Ross Heater & Mfg. Co., Inc.
Preservatives—Asphalt—
American Asphalt Paint Co.
Pulleys—Wood, Iron and Steel—
Continental Supply Co.
Dodge Mfg. Co.
Pulling Machines—
Iron King Mfg. Co.
National Supply Co.
Safety Pulling Machine Co.
Pumpers—Long Stroke—
Farley Machine Co.
Pumping and Pulling Motors—Electric—
Westinghouse Electric & Mfg. Co.
Pumping Equipment—
American Well Works.
Axelson Machine Co.
Bryson Jackson Pump Mfg. Co., Inc.
D & B Pump & Supply Co.
Farley Machine Co.
Gould's Pumps, Inc.
Jones, S. M., Co.
Myers, F. E., Bros. & Co.
Northrup Equipment Co.
Oil Well Supply Co.
Prescott Co.
Ratigan, J. P., Co.
Waukesha Motor Co.
Pumping Gear Units—
Nuttall, R. D., & Co.
Pumping Jacks (See Jacks)—
Pumping Powers—
Bessemer Gas Engine Co.
Buda Co.
Frick-Reid Supply Co.
Jones, S. M., Co.
Kansas City Hay Press Co.
Marion Mch., Fdy. & Supply Co.
National Supply Co.
Oil Well Supply Co.
Pattin Bros. Co.
Reid, Joseph, Gas Engine Co.
Spence Machine Co.
Titusville Iron Works Co.
Pumps—Boiler Feed—
Ajax Iron Works.
Byron Jackson Pump Mfg. Co., Inc.
Fairbanks-Morse & Co.
Gardner Governor Co.
Oil Well Supply Co.
Pumps—Centifrugal—
American Well Works.
Byron Jackson Pump Mfg. Co., Inc.
Dean Hill Pump Co.
Fairbanks-Morse & Co.
Worthington Pump & Machinery Corp.
Pumps—Direct Driven—
Bessemer Gas Engine Co.
Pumps—Electric—
Prescott Co.
Pumps—Fuel Oil Service—
Blackmer Pump Co.
Northern Fire Apparatus Co.
Pumps—Fuel Oil Transfer—
Blackmer Pump Co.
Byron Jackson Pump Mfg. Co., Inc.
Pumps—Gasoline and Oil for Filling Stations—
Gilbert & Barker Mfg. Co.
Pumps—Gear Driven—
Gaso Pump & Burner Mfg. Co.
Lucey Mfg. Corp.
Prescott Co.

Pumps—Hot Oil—
Blackmer Pump Co.
Byron Jackson Pump Mfg. Co., Inc.

Pumps—Pipe Line—
Byron Jackson Pump Mfg. Co., Inc.
Frick-Reid Supply Co.
Gardner Governor Co.
Gaso Pump & Burner Mfg. Co.
National Transit Pump & Machine Co.
Prescott Co.
Worthington Pump & Machinery Corp.

Pumps—Power—
Dean Brothers Co.
Fairbanks-Morse & Co.
Gardner Governor Co.
Gaso Pump & Burner Mfg. Co.
Myers, F. E., Bro. & Co.
National Transit Pump & Machine Co.
Novo Engine Co.
Prescott Co.
Waukesha Motor Co.

Pumps—Refinery—
Blackmer Pump Co.
Byron Jackson Pump Mfg. Co., Inc.
Dean Hill Pump Co.
Gardner Governor Co.
Gaso Pump & Burner Mfg. Co.
National Transit Pump & Machine Co.
Northern Fire Apparatus Co.

Pumps—Rotary—
Blackmer Pump Co.
Northern Fire Apparatus Co.
Roots, P. H. & F. M., Co.

Pumps—Sand—
Bridgeport Machine Co.
Larkin & Co.

Pumps—Slush—
Gardner Governor Co.

Pumps—Steam—
Dean Brothers Co.
Fairbanks-Morse Co.
Frick-Reid Supply Co.
Gardner Governor Co.
Gaso Pump & Burner Mfg. Co.
Lucey Mfg. Corp.
National Transit Pump & Machine Co.
Oil Well Supply Co.
Prescott Co.

Pumps—Suction—
Gaso Pump & Burner Mfg. Co.

Pumps—Vacuum—
Bessemer Gas Engine Co.
Chicago Pneumatic Tool Co.
Clark Brothers Co.
Gaso Pump & Burner Mfg. Co.
Miller Improved Gas Engine Co.
Roots, P. H. & F. M., Co.
Ross Heater & Mfg. Co., Inc.

Pumps—Water—
American Well Works.
Byron Jackson Pump Mfg. Co., Inc.
Gaso Pump & Burner Mfg. Co.
Northern Fire Apparatus Co.
Prescott Co.

Purifiers—Oil Absorption—
Sharpless Specialty Co.

Pyrometers
Brown Instrument Co.
Republic Flow Meters Co.

R

Ratchet Pipe Cutters—
Toledo Pipe Threading Machine Co.

Ratchet Pipe Threaders—
Nye Tool & Machine Works.
Toledo Pipe Threading Machine Co.

Ratchet Reamers—
Nye Tool & Machine Works.

Ratchet Stocks and Dies—
Nye Tool & Machine Works.
Toledo Pipe Threading Machine Co.

Receiving Boxes—
Reid, Joseph, Gas Engine Co.

Recorders—Differential Pressure—
Equitable Meter & Mfg. Co.
Metric Metal Works.

Refinery Equipment—
American Radiator Co.
Braun, C. F., & Co.
Carbondale Machine Co.
Chicago Bridge & Iron Works.
Graver Corp.
Griscom-Russell Co.
Kellogg, M. W., Co.
McKee, Arthur G., & Co.
Newton Process Mfg. Co.
Petroleum Appliance Co.
Petroleum Iron Works Co.
Power Piping Co.
Power Specialty Co.
Reid, Joseph, Gas Engine Co.
Ross Heater & Mfg. Co., Inc.
Ross-Mehan Foundries.
Smith, A. O., Corp.
Smith Separator Co.
Southwestern Engineering Co., Inc.
Southwestern Engineering Corp.
United Iron Works, Inc.
Universal Oil Products Co.
Vogt, Henry, Machine Co.
Walsh & Weidner Boiler Co.
Westcott & Greis.
Widdell Engineering Co.

Refractories—Furnace, Stills and Baffles—
Botfield Refractories Co.
National Gas Products Co.

Refrigerating Machinery—
Carbondale Machine Co.
United Iron Works, Inc.
Vogt, Henry, Machine Co.

Regulators—
Fisher Governor Co., Inc.
Gilfillan Machine Works.
Smith Separator Co.

Regulators—Gas—
Chaplin-Fulton Mfg. Co.
Davis, G. M., Regulator Co.
Equitable Meter & Mfg. Co.
Fisher Governor Co.
Metric Metal Works.
National Gas Products Co.
Smith Separator Co.

Rental Service—
Bridgeport Machine Co.

Reversible Clutches—
Bessemer Gas Engine Co.

Rig Irons—
International Supply Co.
Lucey Mfg. Corp.
National Supply Co.
Oil Well Supply Co.
Parkersburg Rig & Reel Co.

Rigs—Drilling, All Steel—
International Derrick & Equipment Co.
Moore, Lee C., & Co., Inc.

Rigs—Portable Drilling—
National Supply Co.
National Turnbuckle Derrick Co.
Star Drilling Machine Co.

River Clamps (See Clamps)—

Rods—Polish—
Jones, S. M., Co.

Rods—Pull—
Axelson Machine Co.
Columbus Sucker Rod Co.
Jones, S. M., Co.
Sheffield Steel Corp.

Rods—Sucker—
Axelson Machine Co.
Columbus Sucker Rod Co.
D & B Pump & Supply Co.
Frick-Reid Supply Co.
Jones, S. M., Co.
National Supply Co.
Oil Well Supply Co.
Republic Supply Co.
Sheffield Steel Corp.

Rods—Valve—
Jones, S. M., Co.

Roofing—Asbestos—
Johns-Manaville, Inc.

Rope Socket Metal—
Eagle-Picher Lead Co.

Rope—Manila—
Ajax Rope Co., Inc.
Boviard Supply Co.
Republic Supply Co.

Rope—Wire—
Ajax Rope Co., Inc.
American Cable Co.
Bovaird Supply Co.
Bridgeport Machine Co.
Broderick & Bascom Rope Co.
International Supply Co.
Jarecki Mfg. Co.
Leschen, A. & Sons, Rope Co.
Wickwire-Spencer Steel Corp.

Rotary Bit Steel—
Andrews Steel Co.
Heppenstall Forge & Knife Co.

Rotary Drilling Equipment—
Emsco Derrick & Equipment Co.
Frick-Reid Supply Co.
International Derrick & Equipment Co.
Link-Belt Co.
Lucey Mfg. Corp.
Lufkin Foundry & Machine Co.
National Supply Co.
Oil Well Supply Co.
Republic Supply Co.
Titusville Iron Works Co.

Rotary Lines (See Rope—Wire)—

Rotary Post—
Reed Roller Bit Co.

Rotary Tool Joints—
Bartlesville Supply Co.
Hughes Tool Co.

Rubber Belting (See Belting)—

Rubber Hose (See Hose)—

Run Down Tanks (See Tanks)—

Rust Preventatives—
Dearborn Chemical Co.
Eagle-Picher Lead Co.

S

Sand Lines—Manila—
Ajax Rope Co., Inc.
Plymouth Cordage Co.

Sand Lines—Wire—
Ajax Rope Co., Inc.
Broderick & Bascom Rope Co.
Wickwire-Spencer Steel Corp.

Screens—Oil Well—
Layne & Bowler Co.

Screens—Water Well—
Layne & Bowler Co.

Screws Temper—
Burns Tool Co.

Seamless Steel Couplings (See Couplings Seamless Steel)—

Separators—Centrifugal—
Miller, Max B., & Co.
Sharpless Sepcialty Co.
Volz Engineering Equipment Co.

Separators—Gas and Oil—
American Tank Co.
Smith Separator Co.

Sheet Lead—Chemical and Antimonial—
Eagle-Picher Lead Co.

Sheets—Corrugated, Black and Galvanized—
American Sheet & Tin Plate Co.
Ryerson, Jos. T., & Son, Inc.
United Alloy Steel Corp.

Sheets—Steel—
American Sheet & Tin Plate Co.
Republic Iron & Steel Co.
Sheffield Steel Corp.
United Alloy Steel Corp.

Shingles—Asbestos—
Johns-Mansville, Inc.

Sleeves—
Dayton Pipe Coupling Co.
Dresser, S. R., Mfg. Co.

Sleeves—Split—
Dayton Pipe Coupling Co.
Dresser, S. R., Mfg. Co.

Slush Pump Pistons (See Pistons)—

Slush Pumps (See Pumps)—

Smoke Stacks—
Donovan Boiler Works.

Snuffers—Fire—
Simplex Equipment Co.

Sockets—
Acme Fishing Tool Co.
Bridgeport Machine Co.
Spang & Co.

Sockets—Swivel—
Arbon, Paul, & Co.

Sockets—Wire Rope—
Chicago Steel Foundry Co.

Soda Ash—
Mathieson Alkali Works, Inc.

Soda—Caustic—
Mathieson Alkali Works, Inc.

Solders—Bar and Wire
Eagle-Picher Lead Co.
Hoyt Metal Co.

Spark Plugs—
Mosler Metal Products Corp.

Spears—
Acme Fishing Tool Co.
Brown Tool Co., Inc.

Special Steel (See Steel Special)—

Split Sleeves (See Sleeves)—

Sprockets—Power Transmission—
Ajax Iron Works.
Chain Belt Co.

Stands—Vice—
Nye Tool & Machine Works.

Stationary Pipe Threading Die Heads (See Die Heads)—

Steel—All Kinds—
Ryerson, Jos., T., & Son, Inc.

Steel—Alloy—
Central Steel Co.
Timken Roller Bearing Co.
United Alloy Steel Corp.

Steel—Bit—
Central Steel Co.

Steel—Hot Rolled Strip—
Central Steel Co.

Steel—Special—
Andrews Steel Co.
Central Steel Co.
United Alloy Steel Corp.

Steel Band Wheels (See Band Wheels—Steel)—

Steel Bridges (See Bridges)—

Steel Bull Wheels (See Bull Wheels—Steel)—

Steel Castings (See Castings)—

Steel Couplings for Casing, Line Pipe, Drill Pipe and Tubing (See Couplings)—

Steel Crown Blocks (See Crown Blocks)—

Steel Derricks (See Derricks)—

Steel Fabricators—Structural—
Austin Co.
Braden Co.
Graver Corp.
International Derrick & Equipment Co.

Steel Fittings (See Fittings)—

Steel Pitmans—
International Derrick & Equipment Co.
Moore, Lee C., & Co., Inc.

Steel Plate Construction—
Chicago Bridge & Iron Works.
Graver Corp.
Kaw Boiler Works Co.
Petroleum Iron Works Co.
Vogt, Henry, Machine Co.

Steel Sheets (See Sheets, Steel)—

Steel Valves (See Valves, Steel)—

Steel Walking Beams (See Walking Beams—Steel)—

Steel Wheels and Tug Rims—
International Derrick & Equipment Co.

Stills—
Chicago Bridge & Iron Works.
Graver Corp.
Kaw Boiler Works Co.
Kellogg, M. W., Co.
McKee, Arthur G., & Co.
Newton Process Mfg. Co.
Petroleum Iron Works Co.
Smith, A. O., Corp.
Vogt, Henry, Machine Co.
Widdell Engineering Co.

Stocks & Dies—
Borden Co.
Nye Tool & Machine Works.
Toledo Pipe Threading Machine Co.

Structural Steel Fabricators (See Steel Fabricators)—

Stuffing Boxes—
Axelson Machine Co.
Kansas City Hay Press Co.

Sucker Rods (See Rods—Sucker)

Suction Pumps (See Pumps)—

Sulphuric Acid—
Eagle-Picher Lead Co.

Superheaters—Steam—
Power Plant Equipment Co.

Swabs—
Arbon, Paul, & Co.
Burt Corporation.
Guiberson Corp.
Simplex Equipment Co.

Swedge Nipples—
Dresser, S. R., Mfg. Co.
Harrisburg Pipe & Pipe Bending Co.

Swing Line Equipment—
Brooks Engineering Corp.

Swivels—
Layne & Bowler Co.
Lucey Mfg. Corp.
Titusville Iron Works Co.

T

Tank Cars (See Cars—Tank)—

Tank Cars Leased (See Cars)—

Tank Equipment—
Brooks Engineering Corp.
Oil Conservation Engineering Co.

Tanks—Bolted—
American Tank Co.
Butler Mfg. Co.
Maloney Tank Mfg. Co.
Parkersburg Rig & Reel Co.

Tanks—Bulk Station—
Butler Mfg. Co.
Graver Corp.

Tanks—Cylindrical—
Petroleum Iron Works Co.

Tanks—Elevated Steel—
Chicago Bridge & Iron Works.

Tanks—Field Storage—
American Car & Foundry Co.
American Tank Co.
Donovan Boiler Works.
Graver Corp.
Kaw Boiler Works.
Kewanee Boiler Co.
Maloney Tank Mfg. Co.
Petroleum Iron Works Co.
Pittsburgh-Des Moines Steel Co.
Riter-Conley Co.
United Iron Works, Inc.

Tanks—Horizontal Storage—
Graver Corp.
Kaw Boiler Works Co.
Maloney Tank Mfg. Co.

Tanks—Run Down—
Donovan Boiler Works.
Graver Corp.
Kaw Boiler Works Co.
Newton Process Mfg. Co.

Tanks—Truck—
American Tank Co.
Butler Mfg. Co.
White Co.

Tanks—Underground—
Butler Mfg. Co.
Gilbert & Barker Mfg. Co.
Graver Corp.
Kewanee Boiler Co.
Pittsburgh-Des Moines Steel Co.

Tanks—Welded—
American Tank Co.
Chicago Bridge & Iron Works.

Taper Taps—
Hughes Tool Co.

Tapes—Measuring for Oil Gauging—
Lufkin Rule Co.

Temperature Controllers (See Controllers—Temperature)—

Temper, Screws (See Screws)—

Thermometers—Indicating and Recording—
American Schaeffer & Budenberg Corp.
Bristol Co.
Taylor Instrument Co.

Threading Machines—
Bignall & Keeler Machine Wks.
Cox & Sons Co., The.
Landis Machine Co.

Thread Protectors—
Spang & Co.

Tires—Automobile—
Continental Supply Co.

Tongs—
Bridgeport Machine Co.
Wilson Oil Tools Corp.

Tongs—Back Up—
Williams, J. H., & Co.

Tongs—Break Out—
Reed Roller Bit Co.
Williams, J. H., & Co.

Tongs—Casing—
Dunn Mfg. Co.
Guiberson Corp.

Tongs—Chain Pipe—
Armstrong Bros. Teol Co.
Williams, J. H., & Co.

Tongs—Pipe—
National Transit Pump & Machine Co.

Tongs—Rotary—
Dunn Mfg. Co.

Tongs—Tool Joint—
Guiberson Corp.
Hughes Tool Co.
Reed Roller Bit Co.

Tongs—Tubing—
Dunn Mfg. Co.

Tool Chests—Pipe—
Nye Tool & Machine Works.

Tool Joints—
Bridgeport Machine Co.
Federal Supply Co.
Hughes Tool Co.
Lucey Mfg. Corp.
Oil Well Supply Co.
Regan Forge & Engineering Co.

Tool Joint Tongs (See Tongs)—

Tools—Fishing and Drilling (See Drilling and Fishing Tools)—

Torches—
Oxweld Acetylene Co.

Tractor Oil (See Oil—Tractor)—

Tractors—
Cleveland Tractor Co.
International Harvester Co. of America.

Transmission Belt—Rubber—
Goodrich, B. F., Rubber Co.
United States Rubber Co.

Transmission Lining—
Stanley Belting Corp.

Traveling Block—
Lucey Mfg. Corp.
Regan Forge & Engineering Co.
Wright Mfg. Co.

Trenchers—Vertical Boom—
Barber-Greene Co.

Trucks—Motor—
Ford Motor Co.
General Motors Truck Co.
International Harvester Co. of America.
White Co.

Truck Tanks (See Tanks)—

Truck Tires (See Tires—Truck)—

Tubes—Boiler, Charcoal Iron—
Byers, A. M., Co.
Reading Iron Co.

Tubes—Boiler Steel—
Continental Supply Co.
National Tube Co.
Ryerson, Jos. T., & Sons, Inc.

Tubing—
Babcock & Wilcox Tube Co.
Byers, A. M., Co.
Central Tube Co.
Continental Supply Co.
National Tube Co.
Reading Iron Co.
South Chester Tube Co.
Spang, Chalfant & Co., Inc.
Superior Tube Co.
Wheeling Steel Corp.

Tubing Catchers—
Continental Supply Co.
Dunn Mfg. Co.
Guiberson Corp.

Tubing Elevators (See Elevators, Casing and Tubing)—

Tubular Goods—
Continental Supply Co.
Oil Well Supply Co.
Republic Iron & Steel Co.
Spang, Chalfant & Co., Inc.

Tubular Goods—Wrought Iron—
Byers, A. M., Co.
Reading Iron Co.

Turbines for Lighting Equipment
Lucey Mfg. Corp.
Westinghouse Electric & Mfg. Co.

Turbine Generators (See Generators—Turbine)—

Turnbuckle Derricks (See Derricks)—

U

Underground Tanks (See Tanks)

Underreamer Body Steel—
Andrews Steel Co.
Heppenstall Forge & Knife Co.

Underreamers—
Bridgeport Machine Co.
Brown Tool Co., Inc.
Guiberson Corp.
Wilson Oil Tools Corp.

Unions—
Jefferson Union Co.
Kelly & Jones Co.

V

Vacuum Pumps (See Pumps)—

Valuations—
American Appraisal Co.

Valves—Blow-Off—
Homestead Valve Mfg. Co.

Valves—Brass and Bronze—
Homestead Valve Mfg. Co.
Kelly & Jones Co.
Lunkenheimer Co.
Reading Steel Casting Co.
Walworth Mfg. Co.

Valves—Cast Steel—
Chapman Valve Mfg. Co.
Homestead Valve Mfg. Co.

Valves—Check—
Gaso Pump & Burner Mfg. Co.
Lunkenheimer Co.

Valves—Drop Forged Steel—
Edward Valve & Mfg. Co.
Vogt, Henry, Machine Co.

Valves—Gate—High and Low Pressure—
Chapman Valve Mfg. Co.
Crane Co.
Darling Valve & Mfg. Co.
Kelly & Jones Co.
Kennedy Valve Mfg. Co.
Kerotest Mfg. Co.
Ludlow Valve Mfg. Co.
Lunkenheimer Co.
Murray Tool & Supply Co.
Powell, Wm., Co.

Valves—Iron—
Chapman Valve Mfg. Co.
Lunkenheimer Co.
Reading Steel Casting Co.

Valves—Metal Pump—
Durabla Mfg. Co.

Valves—Pump—
United States Rubber Co.

Valves—Relief—Supersensitive—
Davis, G. M., Regulator Co.

Valves—Steel—
Chapman Valve Mfg. Co.
Edward Valve Mfg. Co.
Kelly & Jones Co.
Kerotest Mfg. Co.
Lunkenheimer Co.
Metric Metal Works.
Powell, Wm., Co.
Reading Steel Casting Co.

Valves—Tank Vent—
Brooks Engineering Corp.
Oil Conservation Engineering Co.

Valves—Working Barrel—
Atlas Ball Co.
Axelson Machine Co.
D & B Pump & Supply Co.
Hough, Charles N., Mfg. Co.
Northup Equipment Co.
Oil Well Supply Co.

Varnishes—
Arco Company, The.
Detroit Graphite Co.
Sherwin-Williams Co.

Ventilators—Rotary—
Swartwout Co.

Vises—Bench—
Nye Tool & Machine Works.

Vises—Pipe—
Nye Tool & Machine Works.

Vises—Post—
Nye Tool & Machine Works.

W

Wagons—Truss Wheel—
Athey Truss Wheel Co.

Walking Beams—Steel—
Emsco Derrick & Equipment Co.
Moore, Lee C., & Co., Inc.

Water Cooling Systems—
Power Plant Equipment Co.

Water Softeners and Filters—
Butler Mfg. Co
Graver Corp.

Water Well Screens (See Screens)

Wax—
Barnsdall Refining Co.
Gulf Refining Co.
Pure Oil Co.

Weight Indicators—
Hughes Tool Co.

Welded Tanks (See Tanks)—

Welding Accessories—Electric—
Wilson Welder & Metals Co.

Welding and Cutting Apparatus—
Oxweld Acetylene Co.

Welding Machines—Electric—
Wilson Welder & Metals Co.

Welding Supplies—
Oxweld Acetylene Co.

Welding Wire—
Frick-Reid Supply Co.
Oxweld Acetylene Co.
Wilson Welder & Metals Co.

Well Shooting—
Eastern Torpedo Co.
Zero Hour Torpedo Co.

Wheels—Pipe Cutter—
Nye Tool & Machine Works.

Wheels—Steel Automotive—
Budd Wheel Co.

Winches—
Braden Co.
Brooks Engineering Co.
Oil Conservation Engineering Co.

Wire Lines (See Cables—Steel)—

Wood Patterns and Models—
Gaso Pump & Burner Mfg. Co.

Working Barrels—
Axelson Machine Co.
D & B Pump & Supply Co.
Franklin Valveless Engine Co.
Frick-Reid Supply Co.
Hough, Charles N., Mfg. Co.
McGregor Working Barrel Co.
Norris, W. C.
Northrup Equipment Co.
Oil Well Supply Co.

Wrenches—Closet Spuds—
Nye Tool & Machine Works.

Wrenches—Drop Forged—
Williams, J. H., & Co.

Wrenches—Pipe—
Trimont Mfg. Co.
Walworth Mfg. Co.

Wrenches—Ratchet—
Dresser, S. R., Mfg. Co.
Nye Tool & Machine Works.

Z

Zinc Oxide—
Eagle-Picher Lead Co.

Oklahoma-Kansas and Eastern Pipe Line Report

OKLAHOMA-KANSAS

Pipe Line Statement for March

Runs

	Month	Dy. Av.
*Prairie Pipe Line Co.	3,844,000	124,000
Gulf Pipe Line Co.	1,032,048	33,292
Texas Pipe Line Co.	481,623	15,536
Magnolia Petroleum Co.	1,142,666	36,860
Cosden Pipe Line Co.	904,789	29,187
Empire Pipe Line Co.	682,764	22,025
*Sinclair Pipe Line Co.	1,489,674	48,054
*Other lines	8,091,000	261,000
Total March	17,668,564	569,953
Total Feb.	15,245,347	544,475
Difference	2,423,217	25,478

Shipments

	Month	Dy. Av.
†Prairie Pipe Line Co.	4,588,038	148,001
Gulf Pipe Line Co.	1,117,185	36,035
Texas Pipe Line Co.	759,387	24,496
Magnolia Petroleum Co.	1,490,078	48,067
Cosden Pipe Line Co.	633,864	20,447
Empire Pipe Line Co.	768,407	24,465
†Sinclair Pipe Line Co.	2,700,285	87,106
*Other lines	8,494,000	274,000
Total March	20,540,959	662,617
Total Feb.	19,168,415	618,333
Difference	1,372,544	44,284

Stocks

*Prairie Oil & Gas Co.	27,210,000
*Prairie Pipe Line Co.	2,000,000
Gulf Pipe Line Co. and Gypsy Oil Co.	6,378,816
The Texas Company	3,759,040
Magnolia Petroleum Co.	5,142,309
Cosden Pipe Line Co.	1,856,367
Empire Pipe Line Co.	2,814,802
*Sinclair Crude Oil Purchasing Co.	21,100,000
Carter Oil Co.	14,600,000
*Other lines	9,900,000
Total March	94,761,334
Total February	96,242,376
Difference	1,481,042

*Estimated. †Prairie shipments also include Texas crude oil and Sinclair shipments include Texas and Wyoming crude oil.

Note—Stocks do not include approximately 5,900,000 bbls. held in storage on private tank farms and leases.

EASTERN PIPE LINES

Runs From Wells

In the following table will be found the regular receipts from wells by various pipe lines in New York, Pennsylvania, West Virginia, Ohio, Kentucky and Indiana for February and March:

	Feb. '26	Mar. '26
Nat. Transit	140,427.20	152,572.78
S. W. Pa. P. L.	82,218.00	92,161.74
Eureka P. L.	328,709.96	373,065.58
Buckeye P. L. (Macksburg)	275,240.87	327,422.18
Buckeye P. L. (Cleveland)	10,297.41	11,923.54
Buckeye P. L. (Lima, etc.)	117,052.32	135,330.32
Indiana P. L.	9,530.57	10,428.03
Cumberland P. L.	257,256.68	284,867.52
N. Y. Transit	17,816.08	18,958.88
Tide Water P. L.	136,839.08	154,702.25
Pure Oil	158,793.42	178,024.39
Emery P. L.	43,885.55	51,169.64
Indian Ref.	80,656.88	86,931.73
Paragon Dev.	25,650.67	26,590.23
Pittsburgh P. L.	6,649.29	6,801.52
Total	1,691,032.98	1,910,950.33
Daily average	60,394.03	61,643.56

Note—Indian Refining Co. also reported other receipts of 294,738.45 bbls. Paragon Refining Co. had other receipts of 174,511.17 bbls. Paragon Development had other receipts of 2,462.35 bbls. Pure Oil had other receipts of 64,360.22 bbls.

Petroleum Deliveries

The following tables exhibit the shipments or regular deliveries of various pipe lines in New York, Pennsylvania, West Virginia, Ohio, Kentucky and Indiana for February and March:

	Feb. '26	Mar. '26
Nat. Transit	300,294.95	285,116.90
S. W. Pa. P. L.	320,351.13	389,473.31
Eureka P. L.	148,099.79	188,567.14
Buckeye P. L. (Macksburg)	122,324.18	130,098.28
Buckeye P. L. (Cleveland)	969.77	1,364.43
Buckeye P. L. (Lima, etc.)	705,531.60	744,048.97
Indiana P. L.	1,099,401.49	995,973.29
Cumberland P. L.	150,113.41	151,179.06
N. Y. Transit	526,234.48	579,234.50
Northern P. L.	122,498.92	130,218.72
Tide Water P. L.	143,555.36	174,944.54
Pure Oil	211,673.48	217,525.82
Emery P. L.	44,896.24	48,128.83
Paragon Ref.	118,033.56	159,926.73
Indian Ref.	421,529.21	420,774.92
Paragon Dev.	23,864.81	33,731.97
Pittsburgh P. L.	6,292.15	7,088.04
Total	4,465,661.53	4,657,395.45
Daily average	159,487.91	150,238.56

Gross Stocks

The gross stocks held by various pipe lines in the oil producing sections of New York, Pennsylvania, West Virginia, Ohio, Indiana and Kentucky, at the close of February and March, were as follows:

	Feb. '26	Mar. '26
Nat. Transit	1,010,062.31	1,040,222.33
S. W. Pa. P. L.	668,593.49	690,133.67
Eureka P. L.	1,514,235.47	1,497,216.56
Buckeye P. L. (Macksburg)	372,524.75	351,943.86
Buckeye P. L. (Cleveland)	66,885.32	52,018.53
Buckeye P. L. (Lima, etc.)	2,402,586.47	2,301,324.72
Indiana P. L.	550,608.52	558,421.46
Cumberland P. L.	583,281.41	593,665.61
Southern P. L.	532,095.25	488,804.68
N. Y. Transit	721,540.07	731,527.82
Northern P. L.	481,120.13	468,451.24
Pure Oil	405,108.77	429,500.88
Emery P. L.	29,360.37	32,243.81
Paragon Ref.	71,433.17	85,108.55
Indian Ref.	159,991.34	123,338.21
Paragon Dev.	5,465.24	4,370.50
Pittsburgh P. L.	4,502.80	
Total	9,579,394.88	9,438,292.43
Decrease	279,775.48	141,102.45

Grades of Oil

The following table shows the amount of the different grades of oil held by the eastern pipe lines at the close of February and March showing the gross stocks of the above fields:

	Feb. '26	Mar. '26
Pennsylvania	3,895,733.10	3,842,525.79
Lima	1,022,956.97	958,283.05
Kentucky	1,181,926.35	1,166,146.58
Mid-Continent	3,396,996.28	3,408,098.00
Illinois	81,771.58	63,239.01
Total	9,579,394.88	9,438,292.43

Daily Average Runs

The following table shows the daily average runs of the Pennsylvania, Lima and Kentucky oil fields for the past four years:

	1923	1924	1925	1926
January	75,790	62,638	56,831	55,636
February	71,092	62,023	60,606	60,394
March	76,592	68,721	60,575	61,644
April	75,614	71,058	63,062	.....
May	77,365	63,942	59,217	.....
June	77,593	63,230	61,270	.....
July	71,879	64,208	62,639	.....
August	76,910	59,942	59,686	.....
September	72,358	62,930	62,510	.....
October	76,256	64,976	60,995	.....
November	79,762	56,282	59,350	.....
December	69,271	55,814	57,974	.....

Daily Average Shipments

The following table gives daily average shipments from the Pennsylvania, Lima and other fields for the past four years:

	1923	1924	1925	1926
January	171,067	145,518	157,889	156,056
February	164,219	148,732	160,863	159,488
March	185,487	147,098	154,591	150,239
April	170,761	147,611	151,429	.....
May	177,102	134,997	146,996	.....
June	173,598	143,010	149,467	.....
July	168,330	124,187	161,338	.....
August	142,776	123,120	161,730	.....
September	137,266	127,325	156,719	.....
October	134,597	123,170	145,388	.....
November	131,426	124,400	143,582	.....
December	139,909	151,392	150,162	.....

Gross Stocks

In the following table will be found the gross stocks of the various lines of the Pennsylvania, Lima and Kentucky oil fields, including oil received from other lines, at the close of each month for the past three years:

	1924	1925	1926
January	12,907,202	11,353,276	9,859,170
February	11,844,068	11,192,924	9,579,364
March	10,906,752	11,158,297	9,438,292
April	10,922,742	11,062,082	.....
May	11,335,309	11,207,562	.....
June	11,544,204	11,093,796	.....
July	12,062,361	11,067,453	.....
August	12,221,676	10,974,481	.....
September	12,206,836	10,781,753	.....
October	12,664,061	11,086,850	.....
November	12,268,530	11,068,158	.....
December	11,583,680	10,458,445	.....

Franklin Pipe Line Co.

The following table exhibits the condition of the Franklin Pipe Line at the close of business for the months named and not counted in the stocks and averages reported above:

	Recpts.	Shpmts.	Stocks
1925—			
March	3,177.21	2,354.30	11,898.74
April	3,040.41	1,780.11	13,159.04
May	2,814.99	5,719.90	10,254.13
June	3,052.75	1,221.83	12,086.05
July	2,639.34	3,174.10	11,550.29
August	3,216.97	1,577.99	13,189.27
September	2,929.99	5,352.05	10,767.21
October	2,869.75	1,499.34	12,137.62
November	2,759.66	2,571.32	12,283.40
December	2,661.87	3,441.67	11,503.60
1926—			
January	2,990.16	1,478.35	13,015.41
February	2,580.23	2,776.19	12,819.45
March	2,754.62	1,732.77	13,841.30

The Illinois Field

The following table gives the report of the Illinois Pipe Line Co. in Illinois:

Gross stocks, April 1	2,734,910.63
Runs from wells	723,397.93
Other receipts	472,013.69
Regular deliveries	477,346.01
Other deliveries	520,627.64

The amount of Illinois oil run by the Tide Water Pipe Co. in March was 29,902.81 bbls. and deliveries were 47,279.94 bbls. Adding these figures to those of the Illinois Pipe Line Co. makes the runs and deliveries as follows:

1926—		
April	622,865.14	637,242.85
May	692,671.94	568,573.62
June	700,090.46	589,535.24
July	724,481.26	564,713.19
August	673,652.38	650,649.91
September	706,434.87	510,697.61
October	706,532.00	633,682.32
November	664,556.30	488,449.19
December	665,086.99	578,938.47
1926—		
January	665,243.62	516,083.76
February	632,611.99	506,310.51
March	753,300.74	524,625.95

The Tide Water Pipe Co., Ltd., also delivered in March 127,929.20 bbls. of Oklahoma oil. The total deliveries of all grades by the Tide Water were 350,153.68 bbls.

AVERAGE DAILY RECEIPTS OF CALIFORNIA OIL AT ATLANTIC AND GULF PORTS

Average bbls. per day—	ATLANTIC PORTS						GULF COAST PORTS					Total All Ports
	Baltimore	Boston	New York	Philadelphia	Others	Total	Galveston	New Orleans Baton Rouge	Port Arthur Sabine Pass	Tampa	Total	
December	6,226	12,129	28,452	20,193	9,677	76,677	.....	4,839	4,871	.....	9,710	86,387
January	9,355	13,484	32,581	19,387	5,097	79,804	.....	.....	.....	65	65	79,869
February	13,111	9,464	28,214	24,393	20,107	95,289	.....	.....	.....	.....	.....	95,289
March	7,000	2,516	48,839	16,612	16,903	91,870	.....	.....	.....	.....	.....	91,870

AVERAGE DAILY IMPORTS OF PETROLEUM AT PRINCIPAL UNITED STATES PORTS

Average bbls. per day—	ATLANTIC PORTS						GULF COAST PORTS					Total All Ports
	Baltimore	Boston	New York	Philadelphia	Others	Total	Galveston	New Orleans Baton Rouge	Port Arthur Sabine Pass	Tampa	Total	
December	12,806	20,548	35,613	15,064	30,613	114,644	13,129	25,387	6,935	5,516	50,967	165,611
January	12,451	19,484	49,461	12,645	21,903	115,934	21,903	25,871	5,645	4,871	58,290	174,224
February	14,643	16,071	60,107	9,464	20,750	121,035	22,321	50,250	6,286	6,714	85,571	206,606
March	28,387	15,935	81,742	16,290	34,258	176,612	19,355	44,097	7,096	5,294	75,842	252,454

GROSS PRODUCTION OF THE UNITED STATES FOR 12 MONTHS

(IN BARRELS)

		California	Oklahoma	Texas	Kansas	Arkansas	Louisiana	Rocky Mountains	Eastern Fields	Total
April:	Month	17,959,053	14,055,450	12,695,365	2,971,110	7,560,230	1,767,077	2,744,691	3,084,000	62,837,576
	Daily average	598,655	468,515	423,179	99,037	252,008	58,903	91,490	102,800	2,094,586
May:	Month	18,820,328	14,443,675	13,077,697	3,493,266	11,813,996	1,886,752	2,799,542	3,167,300	69,502,556
	Daily average	607,107	465,925	421,861	112,686	381,097	60,863	90,308	102,171	2,242,018
June:	Month	19,288,135	13,832,970	12,602,540	3,229,440	9,200,372	1,830,965	2,754,498	3,389,000	66,127,920
	Daily average	642,938	461,099	420,085	107,648	306,672	61,032	91,816	109,000	2,204,264
July:	Month	20,411,049	14,263,565	12,337,598	3,686,675	7,835,819	1,898,178	3,129,199	3,348,000	66,910,083
	Daily average	658,421	460,115	397,984	118,925	252,768	61,231	100,942	108,000	2,158,390
August:	Month	21,005,580	14,441,040	11,936,079	3,558,087	7,450,580	1,858,543	3,250,448	3,177,000	66,677,357
	Daily average	677,599	465,480	385,032	114,777	240,341	56,727	104,853	102,484	2,150,883
September:	Month	20,062,763	14,825,040	11,264,890	3,393,270	6,457,950	1,776,570	3,235,625	3,212,000	64,228,108
	Daily average	668,759	494,168	375,496	113,109	215,265	59,219	107,854	107,067	2,140,937
October:	Month	20,015,076	14,921,199	11,196,511	3,477,146	6,409,281	1,871,830	3,394,990	3,248,000	64,534,033
	Daily average	645,648	481,329	361,178	112,166	206,751	60,382	109,500	104,774	2,081,743
November:	Month	19,095,907	14,590,980	10,650,087	3,221,760	5,927,955	1,758,882	3,088,121	2,992,000	61,325,692
	Daily average	636,530	486,366	355,003	107,397	197,599	58,629	102,937	99,753	2,044,190
December:	Month	19,249,711	14,123,348	10,930,455	3,308,816	6,047,883	1,763,966	3,187,164	3,086,900	61,698,743
	Daily average	620,959	455,608	352,595	106,736	195,093	56,902	102,812	99,552	1,990,282
January:	Month	19,069,563	13,674,813	10,880,814	3,250,536	5,489,620	1,606,952	3,136,280	3,014,000	60,122,578
	Daily average	615,147	441,123	350,994	104,856	177,084	51,835	104,396	97,226	1,939,438
February:	Month	17,163,963	12,387,620	9,689,120	2,877,812	4,756,836	1,583,904	2,769,605	2,931,000	54,159,860
	Daily average	612,999	442,415	346,040	102,779	169,887	56,568	98,914	104,678	1,934,281
March:	Month	18,825,786	14,312,886	10,757,341	3,334,887	5,115,837	1,889,946	3,151,250	3,216,000	60,603,933
	Daily average	607,283	461,706	347,011	107,577	165,027	60,966	101,653	103,742	1,954,972
Total 12 months		230,967,514	169,873,086	138,018,497	39,802,805	84,066,359	21,493,565	36,641,413	37,865,200	758,728,439
Daily average		632,620	465,433	378,133	109,049	230,319	58,886	100,388	103,740	2,078,708

The ADVERTISERS' INDEX

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Acme Fishing Tool Co.
Air Cleaning & Reaming Corp.
Ajax Iron Works
Ajax Rope Co.
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American Appraisal Co.
American Asphalt Paint Co.
American Cable Co.
American Car & Foundry Co.
American Mfg. Co. of Texas
American Radiator Co.
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